Learning from the Past: Exploiting Archives for Historical Water Management Research

Thesis submitted in accordance with the requirements of the University of Liverpool for the degree of Doctor in Philosophy by Helen Clare Houghton-Foster

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Contents

Abbreviations

ACRE – The international Atmospheric Circulation Reconstructions over the Earth (ACRE) initiative

AHRC – The Arts and Humanities Research Council

ARA - The Archives and Records Association

CBHE – The Chronology of British Hydrological Events

CRE – Collaborative Research Environment

EIR – Environmental Information Regulations

FoSSA - Friends of the Staffordshire and Stoke on Trent Archive Service

GNP – Gallery of Natural Phenomena

HEA – Historic Environment Assessment

HEI – Higher Education Institution

HLF - National Lottery Heritage Fund, formerly the Heritage Lottery Fund

ISAD (G) – International Standard Archival Description (General)

NCA – National Council on Archives

MPLP – More Product, Less Process

PRO – Public Record Office

PSQG – The Public Services Quality Group

SRO – Staffordshire Record Office

STEM - Science, technology, engineering, and mathematics

TNA – The National Archives

UKAT – UK Archival Thesaurus

UNESCO – United Nations Educational, Scientific and Cultural Organization

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Abstract

This thesis examines the challenges for environmental research in UK archives and presents possible solutions for archivists to implement. It is the result of a collaboration between the University of Liverpool (jointly between the departments of Geography and History) and the Staffordshire Record Office. The result is a multi-disciplinary thesis that unites multiple different fields of research and methods of analysis in order to create solutions and guidance which can support researchers using archives for environmental research.

To achieve this, research with a volunteer project using material held at the Staffordshire Record Office is used as a case study to discuss archival practice. This allows this thesis to position itself with both the archive user and archivist and examine potential solutions from both perspectives. This thesis uses a varied methodology: applying both qualitative and quantitative methods of analysis to archival material then supplementing this with surveys, an interview, and retrospectively assessing the Historic Flooding and Drought in Staffordshire project as though it were a pilot to test solutions to archival problems.

Part 1 presents the case study: a piece of original research into flooding and water in Staffordshire between 1550 and 1750. Legal and administrative records are used to examine how watercourses and flooding were managed in the period and to look for responses to flooding. This is primarily a social-environmental history of mundane water management, drawing on existing traditions of social history. It will then move on to examine the potential of the same records for methods of quantitative analysis borrowed from historical geography to identify flood seasonality, causes and flood-rich periods.

In Part 2, the case study is then coupled with the experience of coordinating a volunteer project in a local record office (Historic Flooding and Drought in Staffordshire) to examine the obstacles to environmental research and propose potential solutions. This will account for both the perspectives and needs of researchers, and archival principles and practice. While this thesis acknowledges that there are no perfect solutions to obstacles to environmental research, it will argue that there are achievable ways of supporting research and positions itself with scholarship that views the archive as dynamic and adaptable.

Two solutions that are achievable within constraints often facing repositories are then presented: subject guides and collaborative projects. Guidance is presented on producing subject guides for environmental research, based on analysis of subject guides as a genre and the premise that environmental researchers can have varied levels of prior experience in archives. Following this, Historic Flooding and Drought is assessed to examine the benefits – and challenges – of collaborative volunteer projects for the volunteers, the archive, and the collaborating researchers.

Acknowledgements

Thank you to Alex Buchanan and Neil Macdonald as my supervisors for their guidance. Both have provided not just academic support but also been very understanding whenever the next curveball has hit my life. I am extremely fortunate in the support I have had during this research, both from my supervisors and wider network. A project like this one that involves working with archive staff and another PhD student is a less lonely experience than a solo project. I am also very grateful to have worked alongside someone with as much love for animals as me and who seemed to always be willing to talk about dogs, thank you Alice.

Without the collaboration, advice and support of the staff at the Staffordshire Record Office, this project would not have existed. Thank you specifically to Rebecca Jackson and Matthew Blake for their work and support, but also everyone who assisted with the project. A second thank you is due to both Alex and Rebecca for both, in different ways, igniting my interest in archives.

The volunteers who I had the privilege of working with on the *Historic Flooding and Drought* project were fantastic, contributing not only their time and hard work, but also their knowledge, experience, and company during my research. The experience of working alongside our group of volunteers shaped this research in ways that were not at all expected, and this thesis is richer for it. My own goals for life after the thesis have also been changed by working on the *Historic Flooding and Drought* project, which has been one of the most rewarding parts of my PhD research.

My time studying has not been straightforward, but I have been fortunate to have an excellent support network. My family have been supportive through every phonecall beginning with "so, I have news…" Thank you Mum and Dad, I cannot promise to ever stop burbling at you about whatever comes to mind. I am also extremely grateful to the friends who have surrounded me. I have known Kataya for so long that none of the names I usually call her are suitable for a thesis, and she is one of the most loyal people I've ever met. Thank you to Elle for the countless conversations putting the world to rights, and to both her and Gina for introducing me to ice skating. It has been an invaluable outlet, combining exercise, stress relief, and socialisation in one. Thank you as well to Danica and Sarah, to Catherine, Elizabeth and Helen and to all the various people who ensured I had some contact with the outside world during the last few years.

While I have had the misfortune of needing it, I am very grateful to the care provided by Liverpool Women's Hospital, the Walton Centre and the wider NHS services in Liverpool.

Working at home, I have had the company of a small fluffy creature who claims to be a dog and my degus, one of whom has very helpfully provided the following contribution to this thesis:

"l o"

Thank you most of all to Foz, I am lucky to have you, and would not have got this far without you.

1 : Introduction

Note on the text: Years have been modernised, i.e. New Year is treated as beginning on January 1st.

On Wednesday 15th September 1708, a "great Rain" flooded the parish of Rugeley, causing (in the estimates of the parish officers) £161 of damage.[1] The flood destroyed a stone bridge built by Walter Chetwynd in 1646, as well as flood gates, dams, hedges, walls, and a chimney. Mills, a forge and a furnace were either damaged or prevented from functioning. Smaller items, vital to individual livelihoods, were washed away, including leather, lasts and shoes. Gravel was strewn in watercourses and water "Run down [the] Towne [with] such force [that] it gall[e]d [the] streets [and] made several holes at least ½ y[ar]d deep, in danger of undermin[ing] sev[erall] houses." Most shops, houses and cellars were in some way damaged. The parish officers' accounts mention no fatalities, and the social after-effects of the flooding are not described, as the accounts were not intended to describe events, but to provide a financial record. One could easily imagine that it took the community in Rugeley months to recover, and that the winter of 1708/9 was probably a very difficult one for many households. But is it possible to find further evidence of the September 1708 flooding and its effects? It seems unlikely that an event as devastating as the Rugeley accounts suggest would have only affected one parish.

The Quarter Sessions rolls from the period show that in October that year one Randolph Bagnall of Rushton Grange was presented before the jury for neglecting to scour and firm the "grid water course called Bridge Meadow" in Burslem, Burton-on-Trent.[2] This may have been due to negligence on Bagnall's part, but if the destruction seen in Rugeley occurred elsewhere in Staffordshire, then maintaining Bridge Meadow may have been more challenging than normal. At the same Michaelmas sessions one John England (a miller) was accused of "stopping" the River Tame.[3] The next two sessions also contain possible effects of flooding: at the Epiphany sessions in 1709 the bridge over Black Brook in the parish of Weeford was recorded as damaged due to flooding (resulting in the drowning of a post

[1] SRO D3243/4/1.
[2] SRO Q/SR/471/11.
[3] SRO Q/SR/471/14.

boy),[4] then at Easter Salter's Bridge in Alrewas needed repairing.[5] However there is no way of determining for sure if any of these instances were connected to the flooding that devastated Rugeley in September 1708.

None of these records were created to record the environment or weather. Instead, they were created for local administration, to keep an account of the parish officers' expenditure or a record of court proceedings. They are typical examples of the types of archival documents standardly found in record offices throughout the UK and as these vignettes illustrate, they can hold a wealth of potential for environmental research - which, as this thesis will argue, remains relatively untapped. Moreover, as will be discussed in Chapter 5, archives in the UK do not record visitors in a way that captures environmental research topics, making these researchers invisible among archive visitor data. Because human activity is usually prioritised in cataloguing practice and the environment has rarely been considered a potential interest of visitors, archive holdings have not generally been catalogued with the environment in mind. The cataloguing work by volunteers on the Quarter Sessions at the Staffordshire Record Office has resulted in the capture of a high level of detail and many catalogue entries contain a comprehensive summary of the case, which can be helpful for many research interests (including the environment). The Quarter Sessions are exceptional, and in most cases potentially useful data might be found in many different records and can be challenging to locate.

This thesis will therefore investigate the role archives in the UK can play in environmental research. Despite an existing body of research from multiple disciplines on the environment using material held in archives, they still have an untapped potential for environmental research. An original piece of research into flooding and water management in Staffordshire c.1550-1750 is used here as an example of how the environment can be researched for periods prior to the collection of instrumental data (Chapters 2-4). The records that will be used are the result of administrative processes, presenting the possibility of examining the management of the environment at both a macro (county-wide administration) and a micro level (estates).

[4] SRO Q/SR/472/1.
[5] SRO Q/SR/473/5.

Those with an intimate knowledge of the material held in a repository (usually archivists) are best placed to realise the potential of an archive's holdings. Therefore, I will argue both that an archive should engage with environmental research and that there are achievable ways of doing this. The case study will be used both to identify some of the obstacles to using archives for environmental research and to suggest potential solutions, resulting in recommendations for how archives can support future researchers. Finally, two specific solutions will be discussed. As subject guides are an achievable way of supporting environmental research, recommendations on how to create subject guides will be presented. Following this, the *Historic Flooding and Drought* project will be used to demonstrate how collaborations with higher education institutions (HEIs) can benefit all parties and are ideal for environmental research.

There are now thoroughly established traditions of using archive material for environmental research, including work in environmental history, historical geography, and historical climatology. However, there has been limited work on how archives can support environmental research.[6] In recent years, there has been growing awareness of both the environmental sustainability of archive practices and the role archives can play in education about climate change.[7] Recent efforts have involved developing projects and resources such as project_ arcc[8] and a virtual workshop at the Archival Education and Research Initiative titled Teaching Climate Change in the Archival Classroom.[9] However, the focus of these endeavours is the sustainability of archives rather than the role they can play in research on the environment. Although the environment has not received much attention in literature on archive studies, there have been rare exceptions.[10] Given the relevance of climate and environment to modern society, it is worth exploring how archives can support

[6] Lucy Veale et al., "Dealing with the Deluge of Historical Weather Data: The Example of the TEMPEST Database," *Geo: Geography and Environment* 4, no. 2 (2017): 1–16.
[7] Mark Wolfe, "Beyond '"green Buildings:"' Exploring the Effects of Jevons' Paradox on the Sustainability of Archival Practices," *Archival Science* 12 (2012): 35–50; Heidi N Abbey, "The Green Archivist: A Primer for Adopting Affordable, Environmentally Sustainable, and Socially Responsible Archival Management Practices," *Archvial Issues* 34, no. 2 (2012): 91–115.
[8] "Project_arcc | Archivists Responding to Climate Change," accessed July 24, 2020, https://projectarcc.org/.
[9] "Workshop: Teaching Climate Change in the Archival Classroom – AERI," accessed July 24, 2020, http://aeri.website/event/aeri2020-workshop-teaching-climate-change-in-the-archival-classroom/.
[10] A. J. W. Catchpole and D. W. Moodie, "Archives and the Environmental Scientist," *Archivaria* 6 (1978): 113–36.

environmental research, in line with the sectoral leader The National Archives' *Archives Unlocked* (2017) vision of the value of archives across society.[11]

This thesis therefore aims to contribute to several different streams of scholarship. By undertaking original research on flood events in Staffordshire, it will contribute to environmental history and the understanding of the interrelatedness of human activity and the environment. The period of focus (1550-1750) is one in which climate variability and extremes have been linked to social and societal unrest.[12] In contrast, instead of focusing on crisis and extremes, the research will focus on the mundane and routine. Everyday water management has been all but overlooked in social and economic history, with a few exceptions examining cleanliness and sanitation.[13] By using administrative archives, I will demonstrate how routine processes (such as the requirement to record court proceedings) can provide a record of the mundane. These records have been overlooked because they are not "about" the environment and are therefore rarely catalogued in a manner which would indicate their usefulness. This presents challenges for both identifying the relevant records in an archive and for analysis. Even when environmental records are calendared, as archivists traditionally use the language of the record, there may be issues with searching for them. The "great rain" in Rugeley in 1708 cited above would not appear in a search for "flood" had the term flood not been added to the description.

The methods used to analyse this data will in turn contribute to historical geography. Historical data and narratives about the past can be helpful for understanding and dealing with the environment today at both scientific and societal levels.[14] One of the case studies that will be used is the Shugborough Estate, prior to catastrophic flooding in 1795 (which washed away many features of the designed landscape), and prior to the creation of the

[11] The National Archives, "Archives Unlocked: Releasing the Potential," 2017, www.nationalarchives.gov.uk/archives-sector.
[12] Geoffrey Parker, *Global Crisis : War, Climate Change and Catastrophe in the Seventeenth Century* (New Haven; London: Yale University Press, 2013).
[13] Mark S. Jenner, "Monopoly, Markets and Public Health: Pollution and Commerce in the History of London Water 1780-1830," in *Medicine and the Market in England and Its Colonies, c.1450-2850*, ed. Mark S. Jenner and P. Wallis (Basingstoke: Palgrave Macmillon, 2007), 216–37; Walter King, "How High Is Too High? Disposing of Dung in Seventeenth-Century Prescot," *The Sixteenth Century Journal* 23, no. 3 (1992): 443–57.
[14] Rob Allan et al., "Toward Integrated Historical Climate Research: The Example of Atmospheric Circulation Reconstructions over the Earth," *Wiley Interdisciplinary Reviews: Climate Change* 7, no. 2 (2016): 164–74.

Park Farm in 1805. The work on the estate following the 1795 flood has been attributed to relatively less flooding since by a (now defunct) blog produced by the estate.[15] Understanding of past environment can help create a narrative for individuals and communities to understand it in the present.

By focusing on the mundane, I will be responding to Christian Pfister's appeal for more examination of the everyday and ask whether it can really be understood in the period 1550-1750.[16] Flooding is often conceptualised as a natural, disastrous event. However, this thesis is just as concerned with understanding flooding as a non-disastrous, mundane, human issue. The possibility of applying quantitative methods of analysing descriptive material to records for this purpose from 1550-1750 will be explored, and I will discuss how effective these methods are in this context.

Further, this thesis aims to contribute to archival scholarship. By reflecting on and further researching the challenges associated with this research, and identifying potential solutions, this thesis aims both to support future research on the environment and to contribute to archival studies in both theoretical and practical terms. My position as a researcher collaborating with an archive service will allow a unique analysis of archival access issues from both the perspective of the researcher and from the archive.

1.1 Background

This thesis is a product of an AHRC funded project *Learning from the past – exploring historical archives to inform future activities*. The project involved two doctoral studentships (myself and Alice Harvey-Fishenden) as Collaborative Doctoral Awards with the Staffordshire Record Office and the University of Liverpool (joint between the School of Environmental Sciences (SOES) and the Centre for Archive Studies (LUCAS) within the Department of History). Collaborative projects such as this are becoming increasingly common, although

[15] "Flooding – Shugborough," 2016, https://shugborough.wordpress.com/2016/01/12/flooding/.
[16] C. Pfister, *Klimageschichte Der Schweiz 1525-1860. Das Klima Der Schweiz von 1525-1860 Und Seine Bedeutung in Der Geschichte on Bevölkerung Und Landwirtschaft* (Bern: Paul Haupt, 1984).

evaluation of their benefits for archives is only just beginning to emerge.[17] Collaboration had arisen from a previous project, *Spaces of experience and horizons of expectation: Implications of extreme weather events past, present and future*. The Staffordshire Record Office wished to develop engagement with academic audiences outside the field of history using the "Revisiting Collections" methodology.[18] The project was intended to combine resource location and analysis through a volunteer project (*Historic Flooding and Drought in Staffordshire*) in order to:

i. Construct histories of flood/drought and associated impacts.

ii. Explore whether and how events affected the lives of local people and became inscribed into the cultural and infrastructural fabric and social memory of local communities.

iii. How the above shaped practices and management actions.

The volunteer project ran from May 2017 to September 2018 at the Staffordshire Record Office, and the data gathered by the volunteers was supplemented by additional research. From the project evolved the following research question(s), which this thesis addresses: How can administrative archives be used in environmental history; what are the challenges associated with their use, and what can archive services do to support such research?

1.2 The Staffordshire Record Office

The Staffordshire Record Office developed from a trust established by the banker and keen antiquary William Salt (1808-1863). The county was given Salt's collection on his death in 1863, and the Trust was formed in 1872. In 1926, the William Salt Library became a manorial repository under the Law of Property Amendment Act (1924), became responsible for county records including Quarter Sessions and asked the county council for an annual

[17] Shaun Evans and Elen Wyn Simpson, "Assessing the Impact of Collections-Based Collaboration across Archives and Academia: The Penrhyn Estate Archive," *Archives and Records* 40, no. 1 (2019): 37–54.
[18] Val Bott et al., "Revisiting Archive Collections: A Toolkit for Capturing and Sharing Multiple Perspectives on Archive Collections," 2009, https://collectionstrust.org.uk/wp-content/uploads/2017/02/Collections-Trust-Revisiting-Archive-Collections-toolkit-2009.pdf.

grant in 1938.[19] In the late 1940s, the first county archivist was appointed in Staffordshire and the first entry in the accessions register is from the ninth of April, 1948, listing parish records for the church in Hamstall Ridware deposited by the vicar of Yoxall.[20] In recent years, local archives in Staffordshire have become increasingly centralised, including the incorporation of Lichfield Record Office into the Staffordshire Record Office in 2018. As well as its body of paid staff, both professional archivists and others, the record office hosts multiple volunteer groups at once, who support the service with a range of activities, including cataloguing, digitisation, and preservation. While the *Historic Flooding and Drought* project was running, the record office also hosted the following projects:[21]

- Magistrates Records
- Quarter Session Records
- Victoria County History research group
- Place-name research project
- Pauper Biographies/Poor law vouchers
- Criminal Quilts
- Parish rights of way
- Gothard Diaries
- Littleton letters
- Stafford at war 1914-18
- Consistory Wills

1.3 Staffordshire

The River Trent originates in Staffordshire in Biddulph Moor, and the Trent system drains around three quarters of the county (Figure 1.1). While the Trent curves from the North-West to South-East of Staffordshire, it is joined by the Blithe at Kings-Bromley, the Sow near Shugborough, which itself is joined by the Penk near Stafford. The Tame is the Trent's largest tributary and begins in Staffordshire but crosses into Warwickshire before returning to Staffordshire with its confluence at Alrewas. The Dove, which will be of particular interest in Chapter 2, forms much of the border between Staffordshire and Derbyshire in

[19] Elizabeth Shepherd, *Archives and Archivists in 20th Century England* (Farnham: Ashgate, 2009), 100.
[20] Staffordshire Record Office accessions register.
[21] Appendix VI.

the North-East, where the Churnet basin drains into the Dove from the edge of the Pennines.[22] The Trent has a long history of flooding, which is imbedded in the name; "Trent" originates as far back as the Brittonic "Tristaston," meaning wanderer or trespasser.[23] One of the longest recorded flood series in the country is for Nottingham, with descriptive records from the thirteenth-century, flood marks inscribed in the Trent Bridge from 1852 and recorded annual flood levels read from a stageboard from 1877 - 1969 with instrumental gauged flows recorded from 1958-present at Colwick (5km downstream of Nottingham).[24] The largest event for which levels are known is 1795 and there is a known history of river management during the period studied here, with kidweirs recorded at Colwich in the sixteenth century.[25] By basing this thesis primarily on material held at the Staffordshire Record Office, it is only the origins of the Trent system and its tributaries that are being investigated, which may experience flooding without serious consequences at Nottingham.[26]

There has been some previous local research relevant to the current project. Staffordshire County Council has produced Historic Environment Assessments (HEAs) for Staffordshire as part of an innovatory integrated approach also including biodiversity and landscape.[27] The HEAs include information on historic monuments, historic land use and summaries of major changes, such as the removal of the village in Shugborough in the eighteenth century.[28] The Staffordshire Archaeological & Historical Society produces its *Transactions* annually. Articles by local historians and archaeologists appearing in *Transactions* detail archaeological projects, which have the potential to yield environmental information. For instance, a

[22] A. D. M Phillips and C. B. Phillips, *An Historical Atlas of Staffordshire* (Manchester: Manchester University Press, 2011), 2.
[23] Richard Jones and Susan Kilby, "Mitigating Riverine Flood Risk in Medieval England," in *Waiting for the End of the World?*, ed. Christopher M. Gerrard, Paolo Forlin, and Peter J. Brown (London: Routledge, 2020), 165–82.
[24] Neil Macdonald, "Reassessing Flood Frequency for the River Trent through the Inclusion of Historical Flood Information since AD 1320," *Hydrology Research* 44, no. 2 (2013): 216.
[25] Macdonald, 219, 223.
[26] Macdonald, 229.
[27] Staffordshire County Council, "Historic Environment Assessments," accessed May 2, 2018, https://www.staffordshire.gov.uk/environment/eLand/planners-developers/HistoricEnvironment/Projects/Historic-Environment-Assessments.aspx.
[28] Cultural Environment Team - Staffordshire County Council, "Appendix 2: Historic Environment Character Area Overviews for the Haywoods," 2009, 2, https://www.staffordshire.gov.uk/environment/eLand/planners-developers/HistoricEnvironment/Projects/StaffordBoroughHEA-TheHaywoods-Appendix2-HECAReports.pdf.

fifteenth century iron mill at Aldridge was investigated based on documentary evidence.[29] Even the (by J. Gould's admission) limited excavation on the probable site revealed the structure of the dam and the probable location of the mill wheel.[30] Stafford Mill has also been excavated, revealing several stages of the mill's history, including a major sixteenth-century reconstruction.[31]

The case study for this thesis has been guided by the available archival material. The medieval manor of Cannock and Rugeley presented itself as a natural area of interest due to the wealth of surviving documents in the Staffordshire Record Office. Moreover, Cannock Chase has already been a focus for several local studies, including a history of medieval Cannock Forest by Gould.[32] A history of the forest on Cannock Chase is continued by C. Welch, who gives a detailed account of Elizabethan ironmaking in Cannock Chase and the Churnet Valley, analysing its impact on the woodlands that were exploited for fuel and how the impact was affected by local, political and technological factors.[33] Welch's history of industry and environment also adds to an earlier history of the Paget family ironworks on the Chase by G. Morton[34] and of the development of the seventeenth-century iron industry in south Staffordshire by P. W. King.[35] More recently, the *Chase Through Time* project has examined the Chase using lidar and historic aerial photographs, mapping the remains of First World War training trenches.[36]

[29] J. Gould, "Excavation of the 15th Century Iron-Mill at Bourne Pool, Aldridge, Staffs.," *South Staffordshire Archaeological and Historical Society Transactions* XI (1970): 58–63.
[30] Gould, 62.
[31] Malcom Hislop, Eleanor Ramsey, and Martin Watts, "Stafford Mill: An Archaeological Excavation 2003," *Staffordshire Archaeological and Historical Society Transactions* XLI (2006): 1–44.
[32] J. Gould, "Food, Forresters, Fines and Felons: A History of Cannock Forest A.D. 1086-1300," *Lichfield and South Staffordshire Archaeological and Historical Society Transactions* VII (1966): 21–39.
[33] C. Welch, "Elizabethan Ironmaking and the Woodlands of Cannock Chase and the Churnet Valley, Staffordshire," *Staffordshire Studies* 12 (2000): 17–73.
[34] Geo. R. Morton, "The Reconstruction of an Industry - The Paget Ironworks, Cannock Chase, 1561," *Lichfield and South Staffordshire Archaeological and Historical Society Transactions* VI (1965): 21–38.
[35] P. W. King, "The Development of the Iron Industry in South Staffordshire in the 17th Century: History and Myth," *Staffordshire Archaeological and Historical Society Transactions* XXXVIII (1997): 59–76.
[36] Historic England, "The Chase Through Time," accessed April 18, 2018, https://thechasethroughtime.blogspot.co.uk/.

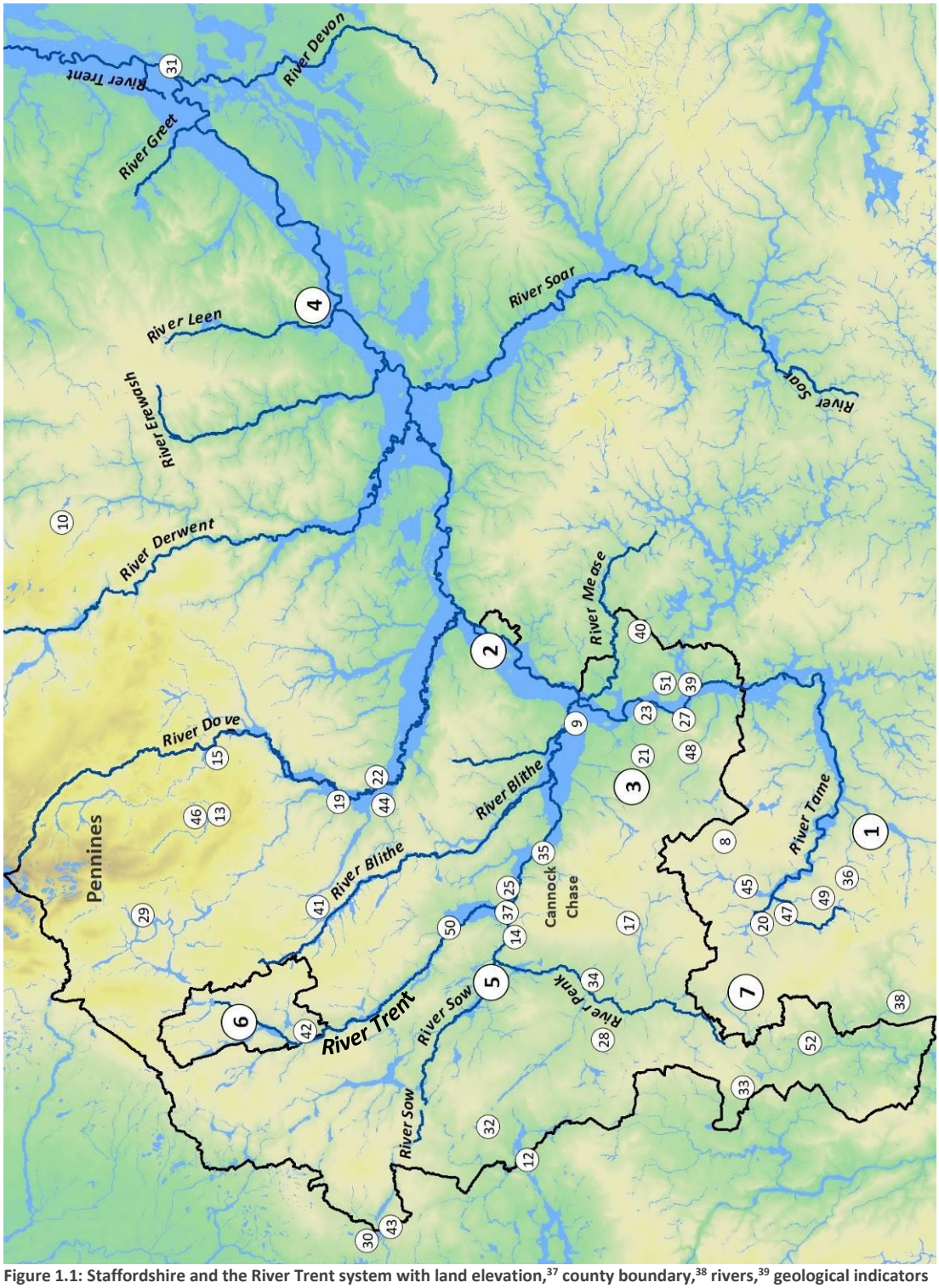
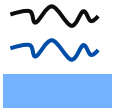


Figure 1.1: Staffordshire and the River Trent system with land elevation,[37] county boundary,[38] rivers,[39] geological indicators of flooding[40] and locations relevant to this thesis.

[37] OS Terrain 50 [ASC geospatial data], Scale 1:50000, Tiles: sj40 - 96, sk00 - 96, so47 - 99, sp07- 99, Updated: 29 May 2019, Ordnance Survey (GB), Using: EDINA Digimap Ordnance Survey Service, <https://digimap.edina.ac.uk>, Downloaded: 2020-10-06 11:50:56.75

Table 1.1: Key for Figure 1.1a



County boundary
River
Indicated flood area

Land height (m above sea level)

1	Birmingham	15	Blore	29	Leek	43	Tyrley
2	Burton upon Trent	16	Bridgenorth	30	Market Drayton	44	Uttoxeter
3	Lichfield	17	Cannock	31	Newark-on-Trent	45	Walsall
4	Nottingham	18	Colwich	32	Norbury	46	Waterfall
5	Stafford	19	Combridge	33	Pattingham	47	Wednesbury
6	Stoke-on-Trent	20	Darlaston	34	Penkridge	48	Weeford
7	Wolverhampton	21	Darnford	35	Rugeley	49	West Bromwich
8	Aldridge	22	Doveridge	36	Sandwell		
9	Alrewas	23	Fisherwick	37	Shugborough	50	Weston
10	Alton	24	Great Haywood	38	Stourbridge	51	Wigginton
11	Amblecote	25	Little Haywood	39	Tamworth	52	Wombourne
12	Aqualate	26	Holme	40	Thorpe	53	Wychnor
13	Ashbourne	27	Hopwas	41	Totmonslow		
14	Berkswich	28	Lapley	42	Trentham		

1.4 Research context

The nature of this thesis has resulted in it drawing from a range of disciplines. Different bodies of literature are more relevant for different chapters, including archival theory, environmental and social history, and historical geography. Sometimes, these different disciplines may overlap or be compared to one another. For instance, examples of citizen science and volunteering in geography may be relevant to discussing volunteer projects in archives, and one of the aims of this thesis is to draw together previously separate bodies of literature. However, other topics have little or no overlap – discussions of legal history,

[38] Boundary-Line™ [SHAPE geospatial data], Scale 1:10000, Tiles: GB, Updated: 18 September 2018, Ordnance Survey (GB), Using: EDINA Digimap Ordnance Survey Service, <https://digimap.edina.ac.uk>, Downloaded: 2019-04-16 14:12:18.604

[39] OS Open Rivers [SHAPE geospatial data], Scale 1:25000, Tiles: GB, Updated: 18 October 2018, Ordnance Survey (GB), Using: EDINA Digimap Ordnance Survey Service, <https://digimap.edina.ac.uk>, Downloaded: 2019-04-16 16:11:23.366

[40] Information on where Superficial Deposits show evidence of flooding: Geological indicators of flooding [SHAPE geospatial data], Scale 1:50000, Tiles: GB, Updated: 1 November 2010, BGS, Using: EDINA Geology Digimap Service, <https://digimap.edina.ac.uk>, Downloaded: 2020-10-06 10:39:12.798

flood seasonality and archive indexing within this thesis will be largely separate. As a result, a single literature review would not unite these different disciplines and subjects in any satisfying way until these seemingly disparate elements are drawn together in detailed discussion. Therefore, each chapter will contain its own summary of the specific literature relevant to that chapter, while this section will situate the thesis as a whole within scholarship on geography and archives.

Human history and the environment have been intertwined for millennia,[41] and human issues of water management are intertwined with natural water systems. Water systems, water management and the environment have interested historians of medical history and public health.[42] Isla Fay, for example, frames her work by connecting a depiction of Norwich as a model of urban hygiene in a 1559 woodcut with its position in the landscape and natural resources.[43] Pollution and sanitation has also been of interest to Walter King and Leona Skelton[44] and development of piped water supplies has interested both Mark Jenner and Carrie Van Lieshout.[45]

There have also been several histories of river systems, including Caroline Crampton and Peter Ackroyd on the Thames,[46] David Blackbourn's work on the Rhine, T. Steinberg on New England and R. White's work on the Columbia River being examples.[47] White's emphasis is

[41] R. White, *The Organic Machine: The Remaking of the Columbia River* (New York: Hill and Wang, 1995), ix; I.G. Simmons, *An Environmental History of Great Britain: From 10,000 Years Ago to the Present* (Edinburgh: Edinburgh University Press, 2001), 5.
[42] Bruce M.S. Campbell, *The Great Transition: Climate, Disease and Society in the Late-Medieval World* (Cambridge: Cambridge University Press, 2016); Andrew Wear, "Making Sense of Health and the Environment in Early Modern England," in *Medicine in Society: Historical Essays*, ed. Andrew Wear (Cambridge: Cambridge University Press, 1992), 119–48.
[43] Isla Fay, *Health and the City: Disease, Environment and Government in Norwich, 1200-1575* (Woodbridge: Boydell and Brewer/York Medieval Press, 2005).
[44] King, "How High Is Too High? Disposing of Dung in Seventeenth-Century Prescot"; Leona Skelton, "Beadles, Dunghills and Noisome Excrements: Regulating the Environment in Seventeenth-Century Carlisle," *International Journal of Regional and Local History* 9, no. 1 (2014): 44–62.
[45] Jenner, "Monopoly, Markets and Public Health: Pollution and Commerce in the History of London Water 1780-1830"; Carry Van Lieshout, "Droughts and Dragons: Geography, Rainfall, and Eighteenth-Century London's Water Systems," *Technology and Culture* 57, no. 4 (2016): 780–805.
[46] Peter Ackroyd, *Thames: Sacred River* (London: Vintage, 2007); Caroline Crampton, *The Way to the Sea: The Forgotten Histories of the Thames Estuary* (London: Granta Books, 2019).
[47] David Blackbourn, *The Conquest of Nature: Water, Landscape and the Making of Modern Germany* (London: Pimlico, 2007); T. Steinberg, *Nature Incorporated: Industrialisation and the Waters of New England* (Cambridge: Cambridge University Press, 1991); White, *The Organic Machine: The Remaking of the Columbia River*.

on labour and energy, with the premise that "Like us, rivers work."[48] In contrast, this thesis will not view the River Trent as working, even though it has been put to work by the mills studied here. The words "labour" and "work" imply intention on the part of an entity, and a purpose that serves human needs. While this work will not completely reject models of scholarship that treat rivers and water as having agency, it does attempt to avoid the conceit of this agency serving human needs. The River Trent does not care whether the mills along it function or not. The emphasis here will be on "management" instead, with the implication that the river is a non-cooperative force that causes difficulties. These histories of rivers and water or flood management have not generally looked prior to the eighteenth century, although Skelton has examined the management of the Tyne from the sixteenth to eighteenth centuries,[49] and John Morgan has studied responses to flooding in Gloucestershire.[50]

In terms of historical climate research and historical hydrology, many engineers, geographers and historical geographers have endeavoured to use archival material to extend the limited range of data available for analysis of flood frequency and severity.[51] While this is a valuable way of increasing understanding of flooding both in the past and the present day, it is restricted by available data. In many areas, instrumental or gauged data only starts in the twentieth century, and sometimes recording has only started as a response to the crisis that hydrologists wish to study. For example, David Archer et al. assess the severity of the flooding of the River Tyne in 2005, which exceeded all floods of the Tyne on gauged record by a significant margin.[52] They compare it to the 1955 floods

[48] White, *The Organic Machine: The Remaking of the Columbia River*, 4.
[49] Leona Skelton, "Regulating the Environment of the River Tyne's Estuary, 1530–1800," in *Environmental History in the Making : Volume II: Acting*, ed. Cristina Joanaz de Melo, Estelita Vaz, and Lígia M. Costa Pinto, vol. 7 (Switzerland: Springer International Publishing, 2017), 241–61.
[50] John Emrys Morgan, "Flooding in Early Modern England: Cultures of Coping in Gloucestershire and Lincolnshire" (University of Warwick, 2015); John Emrys Morgan, "Understanding Flooding in Early Modern England," *Journal of Historical Geography* 50 (2015): 37–50.
[51] A.C. Bayliss and D.W. Reed, "The Use of Historical Data in Flood Frequency Estimation," 2001; N. Macdonald et al., "Historical and Pooled Flood Frequency Analysis for the River Tay at Perth, Scotland," *Area* 38, no. 1 (2006): 34–46; T. R. Kjeldsen et al., "Documentary Evidence of Past Floods in Europe and Their Utility in Flood Frequency Estimation," *Journal of Hydrology* 517 (2014): 963–73.
[52] David R. Archer, Francois Leesch, and Kirsty Harwood, "Assessment of Severity of the Extreme River Tyne Flood in January 2005 Using Gauged and Historical Information," *Hydrological Sciences Journal* 52, no. 5 (2007): 992–1003.

(which prompted the first gauging station on the Tyne to be established in 1956) using published accounts, newspapers, engraved flood stones and photographs.[53]

Even in instances with relatively long and detailed flood histories, routine recording is unlikely to begin before the nineteenth century. For the Trent at Nottingham there are epigraphic markers since 1852, annual flood levels at Trent Bridge from 1877, descriptive records from the thirteenth century and a gauged record since 1958.[54] When looking in archives much before 1800, it is often not possible to search for the same kinds of information as would be available using gauged data, as the data rarely exists. For example, measurements of rainfall prior to the nineteenth century are extremely rare. Attempts to compensate for missing environmental information have taken two main forms: using proxy data to reconstruct past climate or flood patterns (usually over a broad period of time or area), [55] or looking for documentary accounts of flood events and analysing them.[56] The two approaches are not always distinct, as often a combination of approaches are used and sometimes proxy data is drawn from documentary sources, such as the harvest dates drawn from Norfolk manorial records used by Kathleen Pribyl.[57] This thesis primarily relates to the second approach, the use of descriptive material, but will demonstrate the multiple different ways records can be used for qualitative as well as quantitative data.

There have been several efforts to gather information on historical flood events to create lists of flood years and get an impression of frequency, which will be explored in greater depth in Chapter 5. The British Hydrological Society launched the *Chronology of British*

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[53] Archer, Leesch, and Harwood, 998.
[54] Macdonald, "Reassessing Flood Frequency for the River Trent through the Inclusion of Historical Flood Information since AD 1320"; Neil Macdonald and Heather Sangster, "High-Magnitude Flooding across Britain since AD 1750," *Hydrology and Earth System Sciences* 21, no. 3 (2017): 1631–50.
[55] A. Werritty et al., "Use of Multi-Proxy Flood Records to Improve Estimates of Flood Risk: Lower River Tay, Scotland," *Catena* 66, no. 1–2 (2006): 107–19; Christian Pfister, Rolf Weingartner, and Jürg Luterbacher, "Hydrological Winter Droughts over the Last 450 Years in the Upper Rhine Basin: A Methodological Approach," *Hydrological Sciences Journal* 51, no. 5 (2006): 966–85; Adriaan M.J. De Kraker, "Flood Events in the Southwestern Netherlands and Coastal Belgium, 1400-1953," *Hydrological Sciences Journal* 51, no. 5 (2006): 913–29.
[56] Rudolf Brázdil, Dennis Wheeler, and Christian Pfister, "European Climate of the Past 500 Years Based on Documentary and Instrumental Data," *Climatic Change* 101, no. 1 (2010): 1–6; Kjeldsen et al., "Documentary Evidence of Past Floods in Europe and Their Utility in Flood Frequency Estimation"; Bruno Wilhelm et al., "Interpreting Historical, Botanical, and Geological Evidence to Aid Preparations for Future Floods," *Wiley Interdisciplinary Reviews: Water* 6, no. 1 (2018): 1–22.
[57] Kathleen Pribyl, Richard C. Cornes, and Christian Pfister, "Reconstructing Medieval April-July Mean Temperatures in East Anglia, 1256-1431," *Climatic Change* 113, no. 2 (2012): 393–412.

Hydrological Events (CBHE) in 1998 as described in depth by Andrew Black and Frank Law.[58] The database can be searched by date, source, quotation contents, river basin or a contributor to the database. It covers any recorded instance of hydrological event through history that has been identified by contributors, and the earliest entry for the Trent is 530 AD. More recently, *TEMPEST* has been created from the *Spaces of Experience and Horizons of Expectation: The Implications of Extreme Weather in the UK, Past, Present and Future* project (2013-2017), which covers extreme events in England from 1700 onwards. The core difficulty with trying to assemble any "complete" account of early modern hydrological events is that the archival sources that mention them are too varied and scattered, or sometimes simply non-existent. Databases such as the CBHE and *TEMPEST* provide a means of combining data from multiple researchers to build a more complete data series.

Although there is a long history of geographers and engineers using archival source material,[59] there is a distinction between using archival material and engaging with the archive itself, or the processes by which material enters an archive and is made accessible to the user. More recently historical geography has developed a growing body of work examining archive processes through their own direct experience of archive collections. The "archival turn" has seen contributions by researchers from a number of disciplines, including history, literature and art history.[60] In historical geography, work such as that by Dydia DeLyser has involved innovative approaches and understandings of archives as collections that can grow, change and be contributed to by scholars,[61] and have examined the role archives play in social, cultural and disciplinary memory.[62] Sarah Mills has described this recent move as "animating" the archive, and argues that being creative with archives opens new possibilities for researchers in historical-cultural geography.[63] These efforts have

[58] Andrew R. Black and Frank M. Law, "Development and Utilization of a National Web- Based Chronology of Hydrological Events," *Hydrological Sciences Journal* 49, no. 2 (2004): 246–59; British Hydrological Society, "Chronology of British Hydrological Events," 2018, https://www.cbhe.hydrology.org.uk/index.php.
[59] For examples, see: Catchpole and Moodie, "Archives and the Environmental Scientist."
[60] Alexandrina Buchanan, "Strangely Unfamiliar: Ideas of the Archive from Outside the Discipline," in *The Future of Archives and Recordkeeping : A Reader*, ed. Jennie Hill (London: Facet, 2018).
[61] Dydia Delyser, "Collecting, Kitsch and the Intimate Geographies of Social Memory: A Story of Archival Autoethnography," *Transactions of the Institute of British Geographers* 40, no. 2 (2015): 209–22.
[62] Karen M Morin, "Unpopular Archives," *The Professional Geographer* 62, no. 4 (2010): 534–43.
[63] Sarah Mills, "Cultural-Historical Geographies of the Archive: Fragments, Objects and Ghosts," *Geography Compass* 7, no. 10 (2013): 701–13.

encompassed a broad definition of "archival" material, including personal objects and papers,[64] religious archives,[65] field courses and the variety of records associated with them,[66] and the disordered records produced from "foraging" in the University of Glasgow's geography department.[67] This move in historical geography towards engaging with archive theory involves many making efforts to benefit or create the archival systems they wish to see. DyLyser in 2015 sought to contribute to the community she was studying by acquiring archive materials for the Ninety-Nines Museum of Women Pilots, carrying out volunteer service and collaborating on a film, *The Legend of Pancho Barnes and the Happy Bottom Riding Club*. [68]

Unfortunately, the work of historical geographers on archives has not always translated to practical measures that could be employed by an archive service, such as the Staffordshire Record Office, to make an existing collection more accessible. For example, Paul Ashmore et al touch upon the weeding process (the process of deciding which materials to retain and which to "weed out"),[69] but the focus of the article is on the emotions, space and social dynamics of a personal collection rather than the system that Ashmore et al produced in sorting the collection. Joan Schwartz observes that although these "metaphorical and fluid" approaches are valuable, they do not always provide much discussion of the nuances of archival practice, and the archivist is often invisible in the archival turn.[70] Michelle Caswell phrases the issue even more bluntly, saying that "In essence, humanities scholarship is suffering from a failure of interdisciplinarity when it comes to archives."[71] A more forgiving

[64] Paul Ashmore, Ruth Craggs, and Hannah Neate, "Working-with: Talking and Sorting in Personal Archives," *Journal of Historical Geography* 38, no. 1 (2012): 81–89.
[65] Adrian R Bailey, Catherine Brace, and David C Harvey, "Three Geographers in an Archive: Positions, Predilections and Passing Comment on Transient Lives," *Transactions of the Institute of British Geographers* 34, no. 2 (2009): 254–69.
[66] Hayden Lorimer, "The Geographical Field Course as Active Archive," *Cultural Geographies* 10, no. 3 (2003): 278–308.
[67] Hayden Lorimer and Chris Philo, "Disorderly Archives and Orderly Accounts: Reflections on the Occasion of Glasgow's Geographical Centenary," *Scottish Geographical Journal* 125, no. 3–4 (September 2009): 227–55.
[68] Dydia Delyser, "Towards a Participatory Historical Geography: Archival Interventions, Volunteer Service, and Public Outreach in Research on Early Women Pilots," *Journal of Historical Geography* 46 (2014): 93–98.
[69] Ashmore, Craggs, and Neate, "Working-with: Talking and Sorting in Personal Archives," 86.
[70] Joan M. Schwartz, "'Having New Eyes': Spaces of Archives, Landscapes of Power," *Archivaria* 61, no. 1 (2006): 7–8.
[71] Michelle Caswell, "'"The Archive" Is Not an Archives: On Acknowledging the Intellectual Contributions of Archival Studies,'" *Reconstruction: Studies in Contemporary Culture* 16, no. 1 (2016).

approach is provided by Alexandrina Buchanan, who comments on the invisibility of the archivist in the archival turn and criticises perceptions of the archive from outside the discipline, but also argues that archivists should embrace different understandings of the archive.[72]

There are a few who have discussed the practical considerations of creating archival systems for environmental research. Within the 2006 *Archivaria* special issue on archives, space and power, Charles W. Withers and Andrew Grout examined the digital archive "Charting the Nation," an online archive of maps of Scotland, originally from 1550-1740, with the remit later expanded.[73] For archives to adapt to the needs of environmental researchers, their interests need to be more visible in archive studies. Surveys of archive users, such as the *National Survey of Archive Users*[74] do not ask what discipline or subject a user's research falls under, so environmental research could fall under a number of different possible reasons for visiting that are surveyed (local history, academic, preparing for a presentation, site research, for work or as a volunteer for an organisation). The expertise of the experiences of researchers in archives are needed to inform any archive improvement that is genuinely useful. However, work in geography such as Withers and Grout,[75] DeLyser,[76] Ashmore et al[77] and Hayden Lorimor and Chris Philo[78] deal with the creation of new archival collections or systems. An existing service such as the SRO faces the difficulty of adapting an existing collection, including legacy data that is sometimes decades old, presenting a different set of challenges. To resolve these issues, this PhD will

[72] Buchanan, "Strangely Unfamiliar: Ideas of the Archive from Outside the Discipline."
[73] Charles W.J. Withers and Andrew Grout, "Authority in Space?: Creating a Digital Web-Based Map Archive," *Archivaria* 61, no. 1 (2006): 27–46.
[74] Cipfa, "Survey of Visitors to UK Archives 2014," 2014, www.archives.org.uk/images/Public_Services_Quality_Grp/Survey_of_Visitors_to_UK_Archives_-_National_Headline_Report_2016.pdf; Cipfa, "Survey of Visitors to UK Archives 2016," 2017, www.archives.org.uk/images/Public_Services_Quality_Grp/Survey_of_Visitors_to_UK_Archives_-_National_Headline_Report_2016.pdf; Cipfa, "Survey of Visitors to UK Archives 2018," 2019, https://www.archives.org.uk/images/Public_Services_Quality_Grp/Survey_of_Visitors_to_UK_Archives_2018_-_National_Headline_Report_.pdf.
[75] Withers and Grout, "Authority in Space?: Creating a Digital Web-Based Map Archive."
[76] Delyser, "Collecting, Kitsch and the Intimate Geographies of Social Memory: A Story of Archival Autoethnography."
[77] Ashmore, Craggs, and Neate, "Working-with: Talking and Sorting in Personal Archives."
[78] Lorimer and Philo, "Disorderly Archives and Orderly Accounts: Reflections on the Occasion of Glasgow's Geographical Centenary."

explore whether there are practical ways for an archive such as the SRO to adapt to environmental history and historical geography as research interests.

1.4.1 Geography in archival literature

Archivists have not written extensively on archive access for geographical research; however, archives frequently hold large map collections, so cartography has long been of interest to archivists. The winter 1981-82 issue of the journal of the Association of Canadian Archivists, *Archivaria,* titled "Cartographic Archives" contains work on the description and management of cartographic material and collections at the Public Archives of Canada, the Library of Congress and National Archives of the United States, and the University of British Colombia Library.[79] This has been continued with discussion of cataloguing cartographic material by Dorothy Prescott, Nancy Kandoian, Lisa Romero and Nancy Romero, Hugo Stibbe and Andrew Janes.[80] These efforts have been focused largely on the process of accession discussing the acquisition and cataloguing of geographical material. Until the 1990s, archival practice was focused more on custody and it is only relatively recently that users and access have been the focus of archival thinking.[81] In 1997 Terry Cook foresaw an "evolution" of archives from being sites of storage to more contextualised online access.[82]

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[79] Ralph E. Ehrenberg, "Administration of Cartographic Materials in the Library of Congress and National Archives of the United States," *Archivaria* 13 (1982): 23–39; Betty Kidd, "A Brief History of the National Map Collection at the Public Archives of Canada," *Archivaria* 13, no. Winter (1982): 3–22; F. Woodward, "Cartographic Collections at the University of British Columbia Library," *Archivaria* 13 (1982): 99–117; David R. Chamberlain, "The Description of Cartographic Archives Using the Anglo-American Cataloguing Rules, Second Edition," *Archivaria* 13 (1982): 41–46; Dorothy M Ahlgren and John McDonald, "The Archival Management of a Geographic Information System," *Archivaria* 13, no. Summer (1982): 59–65; Nadia Kazymyra-Dzioba, "Building a Map Collection : A Look at Transcripts and Printed Reproductions," *Archivaria* 13 (1982): 67–88.

[80] Dorothy F. Prescott, "Early Maps with or in Printed Publications: Description and Access," *Cataloging and Classification Quarterly* 27, no. 3–4 (1999): 285–301; Nancy A. Kandoian, "Cataloging Early Printed Maps," *Cataloging and Classification Quarterly* 27, no. 3–4 (1999): 229–64; Lisa Romero and Nancy Romero, "Cataloging Early Atlases: A Reference Source," *Cataloging and Classification Quarterly* 27, no. 3–4 (December 15, 1999): 265–84; Hugo L P Stibbe, "Cataloguing Cartographic Materials in Archives," *Cataloging & Classification Quarterly* 27, no. 3 (2009): 443–63; Andrew Janes, "Of Maps and Meta-Records: Eighty-Five Years of Map Cataloguing at The National Archives of the United Kingdom," *The Journal of the Association of Canadian Archivists* 74 (2012): 119–65.

[81] Angelika Menne-Haritz, "Access-the Reformulation of an Archival Paradigm," *Archival Science* 1 (2001): 57–82.

[82] Terry Cook, "What Is Past Is Prologue: A History of Archival Ideas Since 1898, and the Future Paradigm Shift," *Archivaria* 43 (1997): 17–63.

There is a literature on the potential of archives for geographical research. In 1964, Geoffrey Martin advocated for geographic archives and in 1977 D. Moodie highlighted the Hudson Bay Company's Archives as valuable for historical geography.[83] However, there have been few attempts to discuss this potential in relation to archival access and the needs of environmental researchers as users. Laetitia Le Clech's discussion of cartographic archives reflects on the uses and access issues of the archive, and Julie Mathias has examined user responses to finding aids for records of landed estates.[84] These efforts are scarce and have focused mostly on records with obvious relevance, and lacking discussion of potential data in records that are not "about" the environment. While there has been reference to environmental scientists and geographers as archive users, there has been little to no discussion of potential solutions to access issues for environmental or geographical research.

1.5 Key terms

Although interdisciplinary work is increasingly common, there are still differences in the methodologies, source material and language typically used. As this thesis is intended to cross disciplines and have multiple potential disciplinary audiences, including archivists, environmental historians and historical geographers, some terms are being kept deliberately flexible. In Chapter 5 the loose term "water histories" will be used to describe the work of researchers in subjects related to water in the past, with the awareness that this has included place-names,[85] flooding,[86] sanitation[87] and uses of water such as watermills or brewing[88] which might often be intertwined.

[83] Geoffrey J. Martin, "Geographers and Archives: A Suggestion," *The Professional Geographer* 16, no. 6 (1964): 25–27; D.W. Moodie, "The Hudson's Bay Company's Archives: A Resource for Historical Geography," *The Canadian Geographer/Le Géographe Canadien* 21, no. 3 (1977): 268–74.
[84] Laetitia Le Clech, "Archives et Géographie : Typologie, Caractéristiques et Perspectives," *Archives* 47, no. 1 (2017): 59–83; Julie Mathias, "Improving Access to the Records of Landed Estates: Balancing Archival and User Perspectives," *Archivaria* 75 (2013): 145–85.
[85] Richard Jones, "Responding to Modern Flooding: Old English Place-Names as a Repository of Traditional Ecological Knowledge," *Journal of Ecological Anthropology* 18, no. 1 (2016).
[86] Morgan, "Flooding in Early Modern England: Cultures of Coping in Gloucestershire and Lincolnshire."

One of the most significant differences between disciplines relevant to this thesis are the temporal structures used. Reigns of monarchs are largely irrelevant as time frames for the environment. Weather and climate are not constrained by these human structures, nor can we contextualise at a wider, country or European scale when talking about a ruler's timeframes. However administrative and legislative changes accompanying different rulers may have relevance for understanding records of and societal responses to the environment, and for the period in question the so-called "Tudor revolution" in government has had a large impact on the records available to study.[89] For a local study such as this one, administrative systems can be helpful, but looking beyond the boundaries of one country they become irrelevant unless they can be shown to be part of a wider trend. Major religious, societal or cultural shifts might also be used to define time periods (such as the Renaissance or the Reformation) but defining a beginning and end point can be difficult and may not be applicable to all disciplines and fields, although the Enlightenment has been used as a period to define some historical geography.[90] For some studies, a particular event or innovation may be a useful defining point, such as Elizabeth Eisenstein exploring the role of the printing press in the Renaissance, Reformation and science.[91] These can be very context-specific and as this thesis is not a technological history it is not using relevant technologies (such as mill machinery) to define itself. Historians will be used to terms such as "medieval" and "early modern," which are familiar and commonly used terms. One of the areas of scholarship that this thesis draws on is a long tradition of early modern social history, and in this context "early modern" would be a meaningful description of the period this thesis covers. However, "medieval" and "early modern" are terms that have little meaning or use within environmental sciences (with some

[87] Jenner, "Monopoly, Markets and Public Health: Pollution and Commerce in the History of London Water 1780-1830"; Skelton, "Beadles, Dunghills and Noisome Excrements: Regulating the Environment in Seventeenth-Century Carlisle."
[88] Deanne Ashton, "The Industrialization of English Brewing in the Long Nineteenth-Century" (University of Houston, 2018).
[89] Geoffrey Rudolph Elton, *Tudor Revolution in Government; Administrative Changes in the Reign of Henry VIII* (Cambridge: Cambridge University Press, 1969).
[90] John Lewin, "Enlightenment and the GM Floodplain," *Earth Surface Processes and Landforms* 38, no. 1 (January 2013): 17–29.
[91] Elizabeth L. Eisenstein, *The Printing Press as an Agent of Change : Communications and Cultural Transformations in Early-Modern Europe : Volumes I &II* (Cambridge: Cambridge University Press, 1979).

exceptions[92]). Therefore, this term will be avoided in this thesis unless referring to scholarship defining itself as early modern. This thesis will therefore use years and centuries to define time periods in order to be more universally applicable between disciplines.

Different scholars and disciplines have also used varying terminology to describe the kinds of data that are being used in this thesis. The research in Chapters 2, 3 and 4 is based primarily on original documents from the sixteenth to eighteenth centuries held in archives in the UK. Within history, these would often be described as primary sources, although primary sources are not always held in archives. They might also be described as "historical," but Rudolf Brázdil et al have found this to be a problematic term within historical climatology, recognising a move from defining historical climatology as examining "descriptive documentary evidence" to encompass a definition of "historical data" as including anything from any point in the past, including instrumental measurements rather than specifically descriptive documentary source material.[93]

Because most of the source material used here is held in archives, "archival" could be used to describe it in place of "historical," however this presents a similar issue. The material held by archival repositories is unlimited in variety and includes types of source and data that are not being discussed here. Although I have attempted to present conclusions that are as broadly applicable as possible (particularly in Chapter 5), this thesis is based on research in a specific kind of archive, using specific types of material. The research here was undertaken as part of a collaborative projects with a local record office focused on the period 1550-1750. It therefore applies best to the material held by, and activities possible for, a local record office with records created before the routine instrumental recording of the environment.

This thesis is also situated within a large (and growing) body of work using similar material to understand the environmental past. It consciously aims to evaluate the potential of material prior to the routine measuring and recording of the environment (whether temperature, rainfall, or other measurable phenomena). Rather than measure events,

[92] John Lewin, "Medieval Environmental Impacts and Feedbacks: The Lowland Floodplains of England and Wales," *Geoarchaeology*, May 2010.
[93] Rudolf Brázdil et al., "Historical Climatology In Europe – The State Of The Art," *Climatic Change* 70, no. 3 (2005): 365.

these records describe them, sometimes in the form of intentional description, sometimes incidentally. They could therefore be described as "pre-instrumental," however this better applies to the period studied than the records (and other researchers have used physical evidence rather than written records for pre-instrumental periods). Some scholars have referred to human made sources as "documentary," including artefacts such as flood marks.[94]

However, "document" and "documentation" have been used within archival literature in specific ways that were not intended by scholars such as Brázdil. In the last few decades, the traditional concept of the document as written or printed text on paper has been challenged by the rise of new formats, particularly digital documents.[95] A document has been described as whatever functions as a document,[96] or a "talking thing,"[97] which is not limited to the kinds of source used here, which describe rather than measure events. "Descriptive" is a more applicable term for both the records and the data derived from them. The material used for this research is archival as it is held in archives, pre-instrumental as I am examining a period prior to instrumental recording, and descriptive as it is writing 'about' flooding, even if the flooding is not the subject of the text. However, "archival" and "pre-instrumental" will in most contexts be redundant, and as already mentioned include material not covered here. Therefore, through much of this thesis (particularly Chapter 4) uses "descriptive" to define the records studied.

As records originating at the time of the events being examined, and - in many cases - products of these events or circumstances, they might be presumed to be authentic and reliable. However, an authentic document (one which is what it purports to be) is not necessarily a reliable one (one whose content is a verifiable representation of the events or circumstances it describes).[98] Chapter 4 will explore how the authenticity of court records does not guarantee the reliability of the narratives of flooding they present. Contrary to

[94] Brázdil et al., 364.
[95] Geoffrey Yeo, "Rising to the Level of a Record? Some Thoughts on Records and Documents," *Records Management Journal* 21, no. 1 (2011): 10.
[96] Michael K Buckland, "What Is a 'Document'?," *Journal of the American Society for Information Science* 48, no. 9 (1997): 804–9.
[97] David M. Levy, "What Are Documents?," in *Scrolling Forward* (New York: Arcade Publishing, 2001), 21–38.
[98] Luciana Duranti, "Reliability and Authenticity: The Concepts and Their Implications," *Archivaria* 39 (1995): 5–10.

Luciana Duranti's account of the relationship between authenticity and reliability,[99] the controlled circumstances of the court that confer authenticity may also affect these narratives and their reliability, such as by dictating the form and content of records needed for the legal process. Authenticity itself is a disputed concept, often taken to refer to whether a record is what it claims to be.[100] However, Eun Park has looked beyond archives and found differences between professional groups[101] and Chris Duncan has reconstructed the meaning of the word and found authenticity to be subjective.[102] Particular tension has formed around electronic records, for both digitised and "born-digital" records.[103] Anne Gilliland-Swetland argues that the traditional "truth-tests" of authenticity need to be revisited in relation to preserved and reference copies of electronic records.[104] In Chapter 4, there will be some discussion of online databases and the questions this raises about the reliability of these records.

1.6 Methodology and chapter outlines

This thesis began as a piece of research in environmental and social history, examining flooding and water management in Staffordshire in 1550-1750. As the project progressed, I reflected on how it was being shaped by the available material, existing finding aids and being structured around a volunteer project. It became apparent that the research being produced was very different to the thesis I might have written if working on a more traditional (and not collaborative) project. Over time, I realised that the project could serve as a case study into archive access for environmental research and collaborative projects. Because of working as a researcher but also alongside archive staff and with a privileged level of access, I was also in unique position to discuss these issues from the point of view of both the researcher and the archivist. As this was a potential that was only explored in

[99] Duranti, 8–9.
[100] Duranti, "Reliability and Authenticity: The Concepts and Their Implications"; Chris Duncan, "Authenticity or Bust," *Archivaria* 68 (2009): 97–118.
[101] Eun G. Park, "Understanding 'Authenticity' in Records and Information Management: Analyzing Practitioner Constructs," *The American Archivist* 64, no. 2 (2001): 270–91.
[102] Duncan, "Authenticity or Bust."
[103] Bonnie Mak, "On the Uses of Authenticity," *Archivaria* 73 (2012): 1–17.
[104] Anne J Gilliland-Swetland, "Testing Our Truths: Delineating the Parameters of the Authentic Archival Electronic Record," *The American Archivist* 65, no. 2 (2002): 196–215.

hindsight, this affected the methodology used. Volunteers, researchers, and archivists were surveyed after the fact with questions designed to explore whether this project could be considered typical and (where possible) to create data that could be compared to other data, such as Caroline Williams' work on volunteers as existing surveys of archive users.[105] Had this project been planned as a pilot, the methodology may have been different, for instance by surveying volunteers both before and after the project to compare expectations and experience.

To address the resulting research questions, a two-stage approach was taken, with distinct methodologies which will be described in more detail in the relevant chapters. To explore what administrative archives can contribute to environmental research, Part 1 of the thesis (Chapters 2-4) consists of a case study of flooding and water management in Staffordshire in the period c.1550-1750. These chapters will provide an example of research into past environment using material held in a local record office and how that material can be used. This supports a subsidiary aim of the project: that the research should enable archivists at other repositories to create guides to holdings that would support environmental research.

The timeframe 1550-1750 was selected as it predates widespread instrumental measuring of weather, which presents a distinct challenge for researchers. By beginning with the sixteenth-century, this thesis also takes advantage of the records available due to sixteenth-century reforms in English government and administration.[106] Widespread hydrological recording only fully began in the 1950s, and previously had tended to be organised by local city or county engineers, reliant on stage boards as in York with the engineer Alfred Creer in the 1870s.[107] Coordinated meteorological recording began earlier with the work of George James Symons and the British Rainfall Organisation.[108] The weather recording prior to this

[105] Caroline Williams, "Managing Volunteering in Archives: Report," 2014, http://www.archives.org.uk/images/documents/ARACouncil/ARA_Managing_Volunteering_in_Archives_2014_Report_and_appendices_final.pdf; Caroline Williams, "The Impact of Volunteering in Archives," 2018, http://www.archives.org.uk/images/Volunteering/Williams_The_Impact_of_Volunteering_in_Archives_2018.pdf; Cipfa, "Survey of Visitors to UK Archives 2018."
[106] Elton, *Tudor Revolution in Government; Administrative Changes in the Reign of Henry VIII*.
[107] Neil Macdonald and Andrew R. Black, "Reassessment of Flood Frequency Using Historical Information for the River Ouse at York, UK (1200–2000)," *Hydrological Sciences Journal* 55, no. 7 (2010): 1152–62.
[108] D. E. Pedgley, "A Short History of the British Rainfall Organization," *Occasional Papers on Meteorological History* 5 (2002).

(such as weather diaries) was less widespread and consistent.[109] When the environment is the intended subject of the actions being recorded, it is both easier to find and easier to interpret. Other types of records in which the environment appears incidentally are harder to identify and more difficult to interpret in ways that are meaningful.

The capabilities and experiences of volunteers needed to be considered when selecting material. Volunteers were unlikely to have advanced palaeography and Latin skills (although we were lucky to have one who did). This therefore ruled out material that might be too challenging for most volunteers. It also meant that source material needed to engage the volunteers. As will be indicated in Chapter 7 volunteers can be engaged in relatively repetitive tasks if they can see it feeding into a wider project that they find interesting. However, there are limits to this, and a project needs to consider whether the tasks being asked of the volunteers will be engaging, and make sure they are gaining something from the project. This might be developing skills and learning more about the archive (as with the mill accounts) or finding entertaining moments in the records (as many of the "drought" volunteers did). Chapter 7 will further explore what volunteers can get out of volunteering. Considering whether volunteers were likely to find the experience rewarding was one factor in choosing material. For example, while correspondence might be very engaging to read, the handwriting of the most relevant examples was challenging and relevant data in them was scattered and scarce. Therefore, it was concluded that the volunteers might find it a fruitless and frustrating task to examine correspondence if they could not see much benefit from their activity.

The focus on Staffordshire was determined by the scope of the project but offers a valuable insight into the issues at a local and regional level. Local or regional studies are common within social history for the sixteenth to eighteenth centuries, a particularly important work being Keith Wrightson and David Levine's study of Terling.[110] Local histories of sanitation and cleanliness exist for Prescot in Merseyside using manorial records and for Norwich.[111]

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[109] Jan Golinski, *British Weather and the Climate of Enlightenment* (Chicago: University of Chicago Press, 2007).
[110] Keith Wrightson and David Levine, *Poverty and Piety in an English Village: Terling 1525-1700* (New York: Academic Press Inc., 1979).
[111] Fay, *Health and the City: Disease, Environment and Government in Norwich, 1200-1575*; King, "How High Is Too High? Disposing of Dung in Seventeenth-Century Prescot."

More recently, environmental history has included local studies, most relevantly John Morgan examining Gloucestershire.[112]

I will draw on this tradition, but by working in collaboration with an archive and with the aid of volunteers this thesis presents a methodology distinct from most local studies. This resulted in a manner of working that involved integration between the researcher, the archive, and the local community. The material selected and the data gathered were affected by the need to produce tasks for volunteers (as will be discussed below). This is not completely unique, there were other collaborative volunteer projects at the Staffordshire Record Office at the same time as *Historic Flooding and Drought.* However, social-environmental history research for the sixteenth to eighteenth centuries conducted in collaboration is unusual and may have yielded fuller results than if this project had not used a collaborative approach. For example, the majority of searches of the catalogue were made in Calm (the cataloguing software used by the archive) rather than CALMview (the archive user interface), which did affect search functionality, as searching this way made the collections far easier to explore, which will be explored further in Chapter 5.

The majority of the data used to examine flooding and water management was gathered from material held by the Staffordshire Record Office, but supplemented with material at The National Archives (Oxford Circuit Assize records) and data from online resources such as the British Chronology of Hydrological Events.[113] Data collection was in part undertaken with a group of volunteers at the Staffordshire Record Office on the *Historic Flooding and Drought in Staffordshire* project, which will be discussed in more detail in Chapter 7.[114] The volunteers were recruited using the Staffordshire Record Office newsletter and social media as well as by word of mouth.

The selection of material was affected by the nature of the project. It required a coherent theme or series of records for the volunteers, and records that might be too fragmented across the archive service or insufficiently relevant had to be set aside for separate consideration. Because diaries had been examined by the "drought" volunteers and the

[112] Morgan, "Flooding in Early Modern England: Cultures of Coping in Gloucestershire and Lincolnshire"; Morgan, "Understanding Flooding in Early Modern England."
[113] British Hydrological Society, "Chronology of British Hydrological Events."
[114] "Historic Flooding and Drought in Staffordshire – @FloodandDrought," accessed September 30, 2020, https://floodanddrought.wordpress.com/.

journals of Richard Wilkes had been consulted by another researcher and inputted into *TEMPEST*,[115] using them for this thesis seemed redundant. Parish registers have also already been examined for records of weather by Veale et al, including the *Annales Aldervasenses*.[116] Many of these records have provided information that has informed this thesis, but are not the core focus.

For the "flooding" half of the volunteer project, it was decided to focus on watermills as an intersection between human activity and watercourses that is likely to result in records of flooding. This makes them a natural subject to examine in documentation for water management. For instance, a fifteenth century iron mill at Aldridge was investigated based on documentary evidence and cross-referencing of different sources indicated some of the mill's history including ownership. The "flooding" volunteers transcribed the accounts for Burton-on-Trent clay, corn, and malt mills for 1703-9 and leases and title deeds for mills between 1550 and 1750, which have been used in this thesis.

The source types relied on most in this research are administrative and legal: court records and leases and title deeds. The first are records of local government held by local record offices as part of the historical machinery of government; the second are (largely) privately-created records, held in record offices by gift, purchase or on deposit, usually as part of their estates records holdings. In different ways, they can reveal information about how land was managed and the responsibilities of the people who inhabited it. Court records can be used to understand how communities managed water systems and resolved disputes. King has examined similar issues with sanitation using manor court rolls,[117] though King is more concerned with waste and pollution than the flow of water. Court records can also help understand the unique problems a moving and changing river can hold for maintaining boundaries between properties and administrative units (even between counties). Meanwhile, leases can be used to examine the relationships between people and their land, or between tenants and landowners. They usually contain a description of what land is included in the deed (the parcel) and often have clauses relevant to managing water

[115] SRO 5350
[116] Lucy Veale, James P. Bowen, and Georgina H. Endfield, "'Instead of Fetching Flowers, the Youths Brought in Flakes of Snow': Exploring Extreme Weather History through English Parish Registers," *Archives and Records* 38, no. 1 (2017): 119–42.
[117] King, "How High Is Too High? Disposing of Dung in Seventeenth-Century Prescot."

on the property. Both court records and deeds are also records of legal activity. It was therefore necessary to interrogate the law surrounding water and flood management. Joshua Getzler has written a comprehensive volume on legal rights and water in English history,[118] but there is still room to examine how the law and legal systems intersect with social dynamics and the management of flooding and flood damage.

Given the archival focus of the thesis in Chapters 2 and 3, the research is presented according to different classes of records used. This division by record groups (or fonds) is an approach commonly understood by archivists, who classify materials by their provenance[119] and supports the aim that this research should enable the creation of subject guides by archivists working at other similar repositories. Record offices were set up to hold county records, and often Quarter Sessions were the first records they held. Parish records are usually held by the diocesan record office, which in Staffordshire until December 2017 was the Lichfield Record Office and is now the Staffordshire Record Office. It is therefore with local administration that this thesis will begin.

The Quarter Session records for Staffordshire had already been catalogued in detail by another volunteer group. Court records have had little attention as a resource for studying riverine flooding, although they have been examined for coastal flooding.[120] They were chosen as a source material for several reasons. They have not previously been used for environmental history during the 1550-1750 period, although there is a sizeable body of literature on them for other fields of research. The civil functions of courts included roads, bridges and other issues that might yield environmental information. Because of their roles in relation to infrastructure, agriculture, and industry, as well as in resolving disputes, local administrative authorities had a de facto responsibility for the environment. When these records are examined with the environment in mind, the ways in which the justice system of the sixteenth to eighteenth centuries was used to manage the environment become evident.

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[118] Joshua Getzler, *A History of Water Rights at Common Law* (Oxford: Oxford University Press, 2004).
[119] Jennifer Bunn, "Questioning Autonomy: An Alternative Perspective on the Principles Which Govern Archival Description," *Archival Science* 14 (2014): 3–15; David Bearman and Richard Lytle, "The Power of the Principle of Provenance," *Archivaria* 21 (1985): 14–27; Larry Weimer, "Pathways to Provenance," *Journal of Archival Organization* 5, no. 1/2 (2007): 33–48.
[120] James A. Galloway, "Storm Flooding, Coastal Defence and Land Use around the Thames Estuary and Tidal River c.1250-1450," *Journal of Medieval History* 35, no. 2 (2009): 171–88.

Chapter 2 examines the ways in which the courts in Staffordshire responded to and managed flooding. Taking a cue from histories of sanitation, particularly King,[121] this analysis begins at a local level with the manor rolls for Trentham but looking for flooding rather than sanitation issues that resulted from drainage problems. The flooding found at this level will be mundane: a damaged bridge or overflowing ditches. This will show how manor records can reveal which areas were vulnerable to frequent flooding and which individuals were either unable or unwilling to maintain their land in a way that has not previously been examined. It will be noted that the issues appearing are invariably those which affected infrastructure (roads, bridges) or a neighbours' land as problems within an individual's property were not an issue for the manor to resolve. The water appearing in manor courts is troublesome and transcends boundaries. Moving wider to county-level issues in Quarter Session and Assize records, similar themes will emerge on a larger scale, with bridges, major roads and even county boundaries affected by flooding.

Further, many courts have a surviving and relatively continuous series of records, which is sometimes very detailed (and sometimes not). They provide a resource that can span a long time period, so court records have potential for both close studies of short periods, and for examination of longer periods. The Quarter Sessions Rolls were relatively straightforward to examine due to the detail of the catalogue. Manor courts were less simple as the cataloguing is less consistent and it is therefore harder to identify potentially relevant series. Trentham was selected due to several surviving leases and various estate records providing indications early in the project that it might be of interest, with the hope that the available records covering the 1620s to 1640s could provide a sample to demonstrate the wider potential of manor records.

Although it is rare for issues relating to flooding or water management to arise in the Assize courts, they did on occasion settle major issues regarding infrastructure that had not been resolved locally. The Courts of Assize met twice a year in each county and were concerned primarily with major crimes. Staffordshire belonged to the Oxford Circuit, along with Berkshire, Oxfordshire, Worcestershire, Shropshire (Salop), Herefordshire, Monmouthshire, and Gloucestershire. Assizes have usually been examined by historians of crime, such as

[121] Walter J. King, "Early Stuart Courts Leet Still Needful and Useful," *Histoire Sociale / Social History* 23, no. 46 (1990): 271–99; King, "How High Is Too High? Disposing of Dung in Seventeenth-Century Prescot."

James Sharpe or J. Cockburn as they dealt with major crimes, including grand larceny (major theft), murder, and rioting.[122] From the Oxford circuit, the minute books survive and are held by The National Archives.[123] Regrettably, several volumes from the series are severely damaged by mould and damp and can only be viewed by appointment with Collections Care (TNA ASSI 2/3, 2/4 and 2/12). The result of the damage is that up to half of each page of these volumes is either obscured, crumbling or missing (Figure 1.2).

However, there are regular orders relating to the maintenance of highways, as they were vital to local and regional infrastructure, but crossed boundaries so it could be unclear where responsibility lay for maintenance. A great number of the orders for highway repair or maintenance are therefore concerned with assigning responsibility. It was hoped that the same would be the case with bridges, due to their role as part of vital transport routes and because rivers have historically formed boundaries themselves or been key in the development of settlements, industries, and infrastructure. Unfortunately, the hoped-for management of bridges proved to be scarce (which itself is worth noting, particularly in relation to the frequent appearance of highways). The only notable case, Hopwas Bridge, was (unsurprisingly) the culmination of a long dispute in the Quarter Sessions. The scarcity of relevant material in the Oxford circuit does not necessarily indicate that other Assize circuits are not worth examining, for example the Western circuit Assize orders for 1629 to 1648 exist as a print edition and contain four instances of obstruction of watercourses in the twenty-year period they cover.[124]

[122] J.S. Cockburn, *Crime in England 1550-1800* (London: Methuen & Co., 1977); James A. Sharpe, *Crime in Early Modern England 1550-1750* (London: Routledge, 1999).
[123] TNA ASSI 2 1-15.
[124] J.S. Cockburn, ed., *Western Circuit Assize Orders 1629-1648 : A Calendar* (London: The Royal Historical society, 1976).

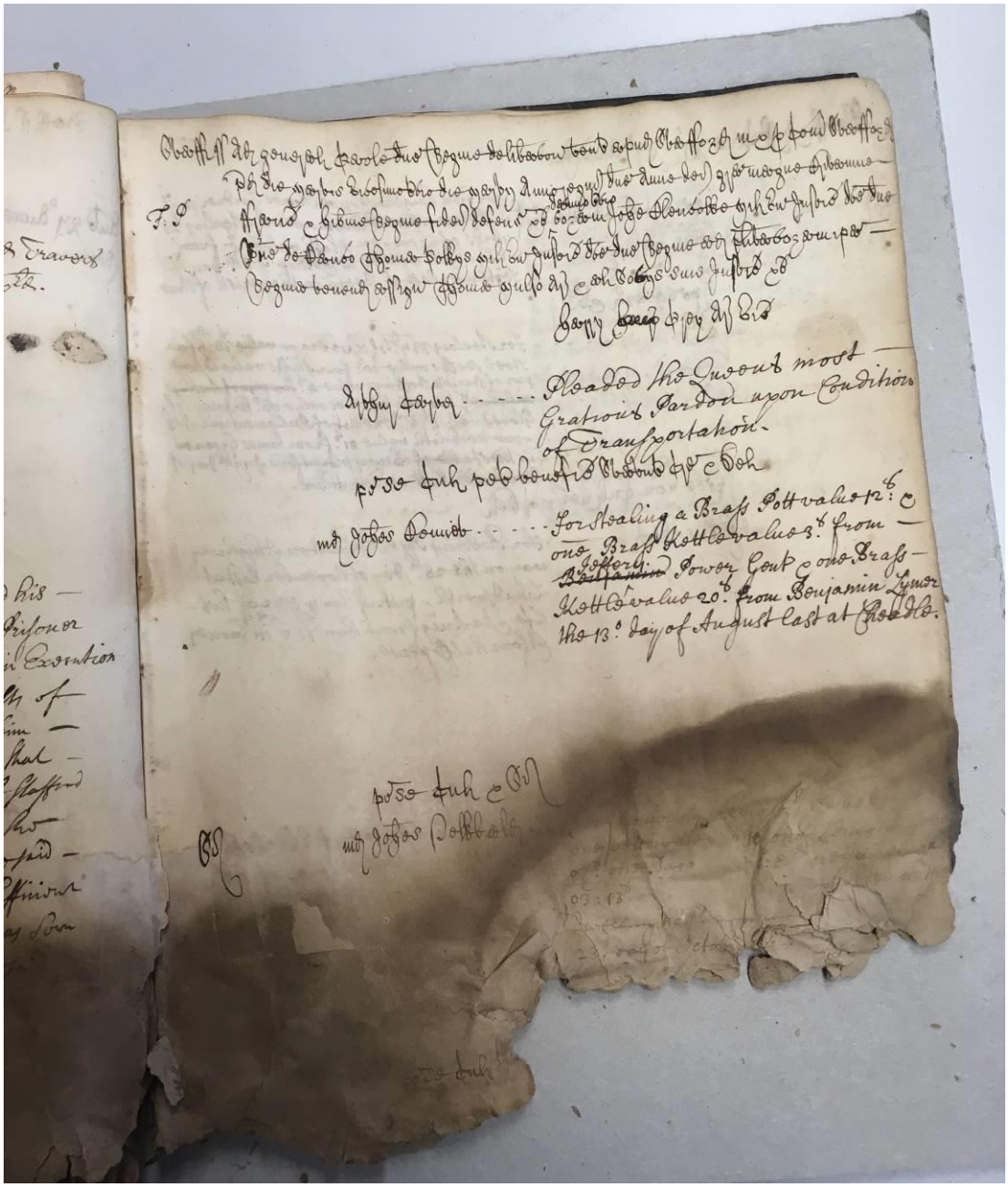

Figure 1.2: Damage to TNA ASSI 2/4

Chapter 3 examines similar themes at a micro level using records produced by estates and individuals. One reason for the potential usefulness of both deeds and leases, as Robert Bearman notes, is that one of the most commonly surviving forms of documentation from the early modern period are title deeds.[125] Many other items of household ephemera (such as correspondence or accounts) may cease to have practical use, while a deed for property

[125] Robert Bearman, "Shakespeares Purchase of New Place," *Shakespeare Quarterly* 63, no. 4 (2012): 465–66.

might need to be produced for examination or for future conveyancing of the property, so were carefully kept with "almost sacrosanct status."[126] For a number of the properties examined for this research, there are surviving series of deeds for the property detailing sales and tenancies over a long period. However, there are few other records of mills from Staffordshire that have survived, making leases and deeds possibly the best option for producing a long series of data on mills in the sixteenth to eighteenth centuries. The properties for which there are complete, or nearly complete, documentation tend to be ones owned by powerful landowning families for which the Staffordshire Record Office holds large collections – the Pagets, Ansons and Leveson-Gowers. The deeds would have been kept for the same reason Bearman identifies: the need to maintain a record of ownership.

Based on close reading of leases, mill accounts and extra-judicial settlements, this chapter aims to discuss the "ownership" of water and resources associated with water (including fish, sedge and power) and to identify what leases can show about the responsibilities for water management that came with occupation of land, and the differing duties of the landlord and tenant. Given the focus on mills, associated leases were selected as a possible source for examining water management and rights. It was determined that leases were more likely to contain relevant data than deeds of title as they only confer use and not possession of land. They are therefore more likely to contain exceptions to the use of land than a title deed would. However, identifying leases in the Staffordshire Record Office catalogue was not completely straightforward. There were many examples of the lease half of a lease and release in the catalogue that were not clearly identified as distinct from leases, particularly among older legacy data. The lease and release was a very common form of deed from around 1600 until the mid-nineteenth century.[127] They were a form of conveyancing used to circumvent the Statute of Uses (1535), which put severe limitations on the transfer of uses (the benefits and responsibilities associated with the property). Because of this, several title deeds other than leases were consulted. Rather than discard this data as irrelevant, estate records were examined more widely, but with leases as the focus.

[126] Bearman, 465–66.
[127] Nathaniel Warren Alcock, *Old Title Deeds : A Guide for Local and Family Historians*, 2nd ed. (Chichester: Phillimore and Co, 2001).

Again based on close reading in the light of the legal context, Chapter 3 also examines the processes and legal arguments by which disputes were resolved, particularly when mills' and farms' interests conflicted with one another along increasingly densely populated watercourses. These records were created to record human activity, but due to their nature as records of the management of land they can be used to understand the relationship between people and the environment they lived in.

Following from these two chapters, Chapter 4 will discuss how the descriptive material discussed in the previous two chapters can be used for quantitative analysis. This chapter will discuss how methods developed by environmental scientists for analysing descriptive material (such as indices) can be applied to the source material from the previous chapters. In the absence of systematic recording of environment or climate, building flood series for pre-instrumental periods requires drawing on multiple different sources of data. The source material that has been used by historical climatologists, hydrologists and geographers has tended to focus on extreme events.[128] Pfister has therefore called for more focus on the mundane, to which this thesis is a response. [129] I will argue that it is important to include the mundane to fully understand the management of water and flooding. This chapter will argue that if considered in their administrative contexts, records that are produced as part of regular legal processes can be extremely useful for examining the mundane as the procedures involved required regular record creation. Contrary to many narratives of flooding, this will consider flooding as frequently a non-disastrous and human event, and therefore account for the role of routine maintenance and repairs in the records used.

1.6.1 *Historic Flooding and Drought* as a case study

Part 2 of the thesis uses the experience of undertaking the research presented in Part 1 to identify challenges both for researchers and archivists and present possible solutions. By

[128] Examples include, but are not limited to: David Archer et al., "Historical Flash Floods in England: New Regional Chronologies and Database," *Journal of Flood Risk Management*, no. November 2018 (2019): 1–14; Rudolf Brázdil et al., "European Climate of the Past 500 Years: New Challenges for Historical Climatology," *Climatic Change* 101, no. 1 (2010): 7–40; Kjeldsen et al., "Documentary Evidence of Past Floods in Europe and Their Utility in Flood Frequency Estimation."
[129] Christian Pfister, "Die 'Katastrophenlucke' Des 20. Jahrhunderts Und Der Verlust Traditionalen Risikobewusstseins," *Gaia* 18, no. 3 (2009): 239–46.

working in collaboration with an archive service, I was positioned both as an insider and a researcher, enabling me to understand the issues for both. The *Historic Flooding and Drought* project was not planned as a piece of action research, so was not organised using the associated methodologies. However, it became apparent during the project that the process itself could be discussed as though it were a pilot project, in order to demonstrate the significance of archival data for environmental research, to identify the associated challenges and potential mitigating strategies, to explore the use of volunteers for research projects and to analyse the value of collaborations between archives and higher education institutions.

However, one example of research cannot be considered representative and the experience of only the researchers is not enough to fully assess the success of the project. A collaborative project such as *Historic Flooding and Drought* involved multiple parties, so it was important to assess the impact on all of them. This was achieved via surveys, questionnaires, and interviews. Each of these methodologies will be discussed in more depth in the relevant chapters (5 and 7), and details of the questionnaires and interview provided in appendices. This self-reflective methodology prompted by working in collaboration had the objective of discussing the issues from a position both within the archive and as a researcher.

Chapter 5 examines how material relevant to the environment might be discovered in an archive, and whether current standards and practices are sufficient to support environmental research. My self-reflective methods, using surveys to provide comparisons against which to assess my own project will allow a broader discussion than enabled by a single research experience alone. Cataloguing standards prioritise the human activity that records document, whilst archivists have not traditionally created finding aids with the environment in mind. As a result, useful data can be challenging for a researcher to locate. This is compounded by the fact that many of the records that could be of use are not "about" the environment, however the environment is intrinsic to many records, and Michelle Bastian and Alex Buchanan found with time in the *Sustaining Time* project.[130] Chapter 5 uses evidence from both archivists and archive users to inform recommendations

[130] Michelle Bastian, Alex Buchanan, and Jen Southern, "Sustaining Time Exploring the Emergent Times of Alternative Economies Final Project Report," 2014.

for engaging with environmental research. I will conclude that there are ways in which repositories can support environmental research which are attainable for most repositories, by focusing on methods that can help inform the user rather than attempting ambitious catalogue enhancement. To contextualise our experiences at the Staffordshire Record Office in relation to other repositories, a questionnaire was sent by email through the National Register of Archives listserve. Furthermore, a convenience sample of researchers in water histories was surveyed by email (Chapter 7, Appendix III), adhering to COVID restrictions imposed within the UK in 2019 near the end of the project. The archive access provided to the Historic Flooding and Drought was unusually privileged, so surveying other researchers aimed to provide the perspective of a more typical research experience. The research suggested that there are ways in which repositories can support environmental research which are attainable for most repositories, employing methods that can help inform the user. This will lead into Chapter 6, which presents professional guidance on creating environmental subjects guides (and thus is presented in a style distinct from the other chapters).

The final chapter moves on to examining one method for achieving these recommendations, that is collaborating with higher education institutions. Assessing the impact of the project on its volunteers required feedback from the volunteers on their experiences with the project and needed to be able to contextualise this with other volunteers at the Staffordshire Record Office. In order to achieve this I conducted a survey of archive volunteers in the summer of 2018 (Chapter 7, Appendix III). To understand the perspective of the archive, a semi-structured interview was conducted after the completion of the project with one of the archivists we had worked with, in order to reflect on whether the project had achieved what had been hoped (Appendix VI).

Because the *Historic Flooding and Drought* project was a collaboration between the University of Liverpool and the Staffordshire Record Office, this chapter will therefore discuss the benefits collaborations between HEIs and archives bring to the researcher, the archive, and the volunteers. Discussion will draw on personal experience from running this project as well as survey responses from volunteers, an interview with one of the archivists at the record office and input from other professionals across the country. This chapter will argue that collaborative projects can be particularly beneficial for environmental research. These projects provide novel opportunities for volunteers to build their skills and can even assist with skills training of volunteers (which is one of the most common motivations for

volunteering). Meanwhile the archive can benefit from profile-raising with projects with clear contemporary relevance. They can also provide very valuable assistance with data collection for the researcher and this chapter will discuss both the volume of work undertaken by the *Historic Flooding and Drought* volunteers and the ways in which other volunteer projects (such as cataloguing that has been done on the Quarter Sessions) benefited this thesis. Further, the volunteers' own knowledge and love for their local area can bring to a project topographical knowledge that the researcher may not have.

Part 1: Flooding and water management in Staffordshire (case study)

2 : Records of Local Administration

In 1656, the inhabitants of Combridge petitioned the Quarter Sessions for help in maintaining a bridge that had been rendered "by force of the water that come from the Hills unpassable."[1] Because this was an issue that affected the whole community, the Quarter Sessions include a petition from Combridge as a whole rather than from individuals, and was not the responsibility of any specific individual to resolve. Because flooding was often a problem for whole communities, it is necessary to understand communities and the responsibilities of local administration to understand responses to flooding. This chapter will examine records of local administration and the management of water in communities, and how boundaries were managed, infrastructure was maintained, and responsibility or jurisdiction determined. The resilience of a community to flooding depended on the ability to respond to and mitigate the effects of flooding. This meant that when damage occurred, liability for repair work and maintaining flood defences needed to be established. In the process of this analysis, many individuals will also emerge as records of local administration are also records of individual people and have often been used as such by social historians. The characteristics of local administration that make these records useful for examining communities also makes them valuable for understanding the intersection between the activity of individuals, communities, and their environment.

The concept of community, and associated issues with neighbourliness and communal responsibility, has been the topic of an extensive historiography of the sixteenth to eighteenth centuries. In the 1970s, Alan Macfarlane described the tightly-knit, stable pre-industrial community as a "myth."[2] After all, social relationships within a defined geographical area (e.g. a parish or manor) and a sense of belonging are not the same thing.[3] Given the levels of mobility and transience, with the poor in particular moving out of necessity,[4] a geographical area would contain a number of people who were not a permanent part of the "community," and social networks can at times be more useful to

[1] SRO Q/SR/293/4
[2] Alan MacFarlane, *Reconstructing Historical Communities* (Cambridge: Cambridge University Press, 1977), 1.
[3] MacFarlane, 3.
[4] Joan R. Kent, "Population Mobility and Alms: Poor Migrants in the Midlands during the Early Seventeenth Century," *Local Population Studies* 27 (1981): 35–51.

the historian than geographical area. Social networks can be based on area, such as the relationships between neighbours, or transcend them when people moved or formed connections in other ways. Community has been defined by Philip Withington and Alexandra Shepard as an expression of collective identity, which might be approached in a number of ways: institutional processes and roles; the people participating (or not participating) in the community; the acts and artefacts that defined and made the community; the geographical place of the community; the time in which the community existed; or the rhetoric by which it was defined, legitimised or represented.[5] Thus, community can be defined, but can also be expressed and explored in different ways.

Good neighbourliness has been described as a crucial social ideal in sixteenth and seventeenth-century England.[6] Within a community, individuals' actions would have effects on their neighbours: improper use of common land would impact others' use of it, damage to wells would affect access to water, or failure to maintain ditches might cause flooding. It is also a period which has been characterised as very litigious, in which people were willing to make use of the mechanisms of law and order to settle disputes.[7] This apparent contradiction suggests fractured communities willing to use the law to mediate differences and air disagreements, as a sense of neighbourliness was not sufficient to keep the peace.[8] Participation in legal processes was common, and men of middling status (rather than gentlemen) were both the victims most likely to prosecute and those most likely to be obligated to participate in enforcement.[9] The courts were a mechanism through which communities were managed both by authorities and by community members.

While defining a community can be challenging, and communities were often quite fractured, there are multiple ways of accessing or analysing a community. For the most

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[5] Philip Withington and Alexandra Shepard, *Communities in Early Modern England: Networks, Place, Rhetoric* (Manchester: Manchester University Press, 2000), 12.
[6] Keith Wrightson, "The Politics of the Parish in Early Modern England," in *The Experience of Authority in Early Modern England*, ed. P. Griffiths, A. Fox, and S. Hindle (London: Palgrave, 1996), 18; Steve Hindle, *The State and Social Change in Early Modern England, 1550–1640* (Basingstoke: Houndmills, 2000), 94.
[7] Wrightson and Levine, *Poverty and Piety in an English Village: Terling 1525-1700*, 113; Garthine Walker, *Crime, Gender and Social Order in Early Modern England* (Cambridge: Cambridge University Press, 2003), 2; Hindle, *The State and Social Change in Early Modern England, 1550–1640*, 97.
[8] Hindle, *The State and Social Change in Early Modern England, 1550–1640*, 94.
[9] Cynthia B. Herrup, *The Common Peace: Participation and the Criminal Law in Seventeenth-Century England* (Cambridge: Cambridge University Press, 1987), 2.

part, records discussed in this chapter were generated by governing institutions and thus played an integral role in the administration of an area (and whoever happens to fall within that area), rather than the more private records of an individual estate or business as will be the case in the next chapter. The material these records were consulted for is also always tied to a place – a specific bridge, ditch, river, etc. The "community" in question is thus the network of people around and affected by that place, such as the village surrounding a bridge and the users of that bridge (as in Hopwas). In examining maintenance of drainage, rivers and bridges, the people to whom these records refer are likely to be, usually, those who held the land and were responsible for it. They were therefore more permanent, stable members of the community (rather than transient workers, vagrants or other poorer inhabitants of the area).[10] In this respect, the community as a geographical area still makes some sense when used for this particular study, even if it can present issues.

2.1 Parish registers

The parochial system in England predated the Norman Conquest and by the sixteenth century the whole of England was divided into parishes or equivalents. They were thus a natural unit to be used for local civil administration under a series of Acts passed in the sixteenth and seventeenth centuries for registration of life events and dealing with poverty, law and order and other local issues. Parish records are therefore an obvious source for local history, including environmental history. Under the Parochial Records and Registers Measure (1978) they are usually deposited at the Diocesan Record Office, which is normally the County Record Office. In Staffordshire, the Lichfield Diocesan Record Office was merged with the Staffordshire Record Office in 2017. Parish registers have been studied by Lucy Veale et al to demonstrate their utility for understanding extreme weather,[11] and by Morgan alongside the commissions of sewers, pamphlets and other popular printed

[10] This is a theme in: Keith Wrightson, "Aspects of Social Differentiation in Rural England, c. 1580–1660," *The Journal of Peasant Studies* 5, no. 1 (1977): 33–47.
[11] Veale, Bowen, and Endfield, "'Instead of Fetching Flowers, the Youths Brought in Flakes of Snow': Exploring Extreme Weather History through English Parish Registers."

literature. [12] Parish registers sometimes record the most extreme events, noting how these events affected the church, congregation and local landscape. Alrewas parish register is particularly rich, fortuitous for a parish whose name also indicated a liability to flooding. Alrewas is from the Old English *alor*, "alder," *and wæsse*, meaning "plain liable to sudden flooding and draining," giving the vivid image of a flood plain populated with alder trees. Indeed, the parish register contains evidence of storms, floods, and several deaths linked to the weather. It is because of this that Veale et al's study makes use of it, and thus their research does not need to be duplicated here.

Veale et al's emphasis is in examining parish registers is on extreme weather events, finding storms, strong winds, frosts and extreme cold, including a "great Tempest" in Alrewas in 1593.[13] They also discuss weather's impact on food, harvests, disease and mortality. However, this thesis is often examining water management and effects of or recovery from flooding rather than weather. A theme in this chapter and the next will be responsibility and legal rights, and by examining local administration this chapter will focus on infrastructure and communities. Parish registers have potential here too. Alrewas parish register contains drownings, a detailed description of Burton Bridge prior to damage in 1795, the £100 rebuilding of Salters' Bridge in 1601, and damage from the 1795 flood.[14] Although parish registers are not being examined closely here and the focus of this thesis is more on the mundane than the extremes parish registers usually record, this material will be used to supplement other findings.

2.2 Court Records

This leaves the records of the legal system in the sixteenth to eighteenth centuries as the focus of this chapter, providing a very different insight to previous work by Veale et al or Morgan. Parish registers record the events most of interest to the recorder, and Morgan's work has examined narratives and cultures of flooding – how people in the early modern

[12] Morgan, "Understanding Flooding in Early Modern England"; Morgan, "Flooding in Early Modern England: Cultures of Coping in Gloucestershire and Lincolnshire."
[13] Veale, Bowen, and Endfield, "'Instead of Fetching Flowers, the Youths Brought in Flakes of Snow': Exploring Extreme Weather History through English Parish Registers," 13.
[14] SRO D783/1/1/1.

period responded to and explained flooding. However, the function of a record affects the way events are recorded and interpreted in it, and the purpose of the legal system was enforcing the law, as well as the responsibilities and rights of communities. Therefore, the material drawn from these sources (manor courts, Quarter Sessions and Assizes) is concerned with maintaining infrastructure, ordering repairs and reparation when damage occurs, and ensuring that communities were able to function without major difficulties. Theological questions of providence therefore are not a priority, instead this chapter will discuss who was responsible for infrastructure such as bridges, who had to pay, and what problems flooding could cause for a community.

The court system of England in this period has been extensively studied in other contexts, in particular by those interested in criminal history such as James Sharpe[15] or Douglas Hay,[16] or in the system itself such as J. S. Cockburn.[17] Meanwhile, Wrightson and Levine have demonstrated the detail in which parish life can be reconstructed using parish records.[18] However, some attention could be given to how systems of justice and governance can be used to manage water systems and flooding. Getzler has produced a comprehensive study of water rights,[19] but Geltzler's work focuses on legal rights rather than using the law to examine the management of water. Using the court system to examine these issues will naturally tilt any work towards questions of jurisdiction and the ways in which responsibility was assigned by authorities, and whether that responsibility fell to an individual, a community, or a governing body. When discussing water, these questions become particularly complex. Waterways both formed boundaries and crossed them; the River Dove is the boundary between Staffordshire and Derbyshire, splitting responsibility for the River between two counties, and did not always form a stable boundary. Even if it was not a boundary, a river, stream or ditch would flow through multiple individuals' land or through the jurisdictions of multiple courts meaning any action

[15] Sharpe, *Crime in Early Modern England 1550-1750*.
[16] Douglas Hay et al., eds., *Albion's Fatal Tree: Crime and Society in Eighteenth-Century England*, revised ed (London: Verso, 2011).
[17] J.S. Cockburn, *A History of English Assizes 1558-1714* (Cambridge: Cambridge University Press, 1972).
[18] Wrightson and Levine, *Poverty and Piety in an English Village: Terling 1525-1700*.
[19] Getzler, *A History of Water Rights at Common Law*.

altering the flow of water or location of watercourse could affect several properties, and responsibility for managing the water could be split between multiple parties.

2.2.1 Manor courts

In medieval England, the manorial courts were the lowest courts of law and the medium through which lordship was exercised at local level although unlike parishes, the manorial system was not comprehensive in its coverage. Their civil jurisdiction was central to agrarian life as the institution through which copyhold land tenures, rents and transactions were administered, along with economic resources such as mills, fisheries and rights to minerals.[20] They survived inconsistently into the sixteenth to eighteenth centuries, thus had been for some time overlooked by early modern historians, with the likes of Wrightson and Levine characterising them as having "ceased to have any function other than the registration of land transactions."[21] However, in the last few decades they have been re-examined and hailed by historians as a resource for social histories, as they provide a unique insight into the lives of ordinary people.[22] As institutions essential to life in areas where they continued, manor courts can also be revealing sources for environmental history, providing details of the management of land. By the sixteenth century, their role was changing. Brodie Waddell has demonstrated that they were far from decaying relics of an earlier age, instead having an increasing focus on infrastructure.[23] It has been rare that a history using these records has paid much attention to drainage, despite it being a crucial presence in daily life, though Waddell is one exception,[24] and King makes effective use of manor courts to understand sanitation in seventeenth-century Prescot.[25] Waddell finds that by far the most frequent offences handled by manor courts between 1550 and 1850

[20] Mark Bailey, *The English Manor c.1200-c.1500* (Manchester: Manchester University Press, 2002), 1–3.
[21] Wrightson and Levine, *Poverty and Piety in an English Village: Terling 1525-1700*, 112.
[22] Bailey, *The English Manor c.1200-c.1500*, 1; P. Morris, "Small Court of the Manor of Haywood in the Reign of Elizabeth I," *Staffordshire Studies* II (1990): 4; King, "Early Stuart Courts Leet Still Needful and Useful."
[23] Brodie Waddell, "Governing England Through the Manor Courts, 1550-1850," *The Historical Journal* 55, no. 2 (2012): 279–80.
[24] Waddell, "Governing England Through the Manor Courts, 1550-1850."
[25] King, "How High Is Too High? Disposing of Dung in Seventeenth-Century Prescot."

concerned local infrastructure, of which nearly half involved drains, ditches and dykes.[26] Some geographical variance is noted by Waddell, as the lowland Yorkshire manors predictably suffered greater drainage issues than the upland ones, and a similar pattern was found elsewhere in the country.[27]

Where manor courts continued in sixteenth to eighteenth centuries, such as in Trentham, it was the manor which primarily regulated drainage in the local community. Examination of the interactions between individuals, local governance, and the community has been limited to areas with plentiful surviving records, as with Wrightson and Levine's study of Terling in Essex.[28] Fortunately, there are several parishes in Staffordshire for which either manorial records or parish registers survive. While they do not always present the same opportunities as the records for Terling, examples such as the manor court records for Trentham still contain many details useful for examining drainage. Trentham is separated from Stoke-on-Trent by the River Trent, with the present-day lake originally designed by Capability Brown[29] and with further alterations in the nineteenth century (Figure 2.3). Thus, the surviving nineteenth-century plans of the area do not give a completely accurate indication of the seventeenth- and eighteenth-century landscape (Figure 2.2, Figure 2.3). These plans only show the area around the lake, not the whole manor. This, combined with urban spread since then, makes it challenging to compare references to places in the earlier manor records with the later landscape.

Trentham was a Court Baron with View of Frankpledge, a system that had originated centuries before, and by the eighteenth century only existed in a handful of surviving manor courts. The court held the authority to resolve disputes and try nuisance offences, and View of Frankpledge rested responsibility on adult male inhabitants of the manor.[30] The surviving Trentham manor records are patchy, but sufficient to construct an impression of how maintaining drainage was enforced. Pains (fines) survive for much of the 1620s to

[26] Waddell, "Governing England Through the Manor Courts, 1550-1850," 291–92.
[27] Waddell, 292, 295.
[28] Wrightson and Levine, *Poverty and Piety in an English Village: Terling 1525-1700*.
[29] The Trentham Estate, "Trentham Gardens," accessed January 28, 2019, https://www.trentham.co.uk/trentham-gardens/.
[30] D. A. Crowley, "The Later History of Frankpledge," *Bulletin of the Institute of Historical Research* 48, no. 117 (1975): 1–15.

1640s,[31] and notes added to some entries indicate times when the pain was restated. For example, a pain regarding the scouring of ditches from the 25th April 1629 has additional notes dated 1638, 1639, 1640, 1642 and 1647 (Figure 2.1). Record survival is patchy and they are no longer in order, but some rearranging and comparison with the notes where pains are continued shows that there is some coverage for the entirety of the 1630s, some of the 1620s and much of the 1640s.

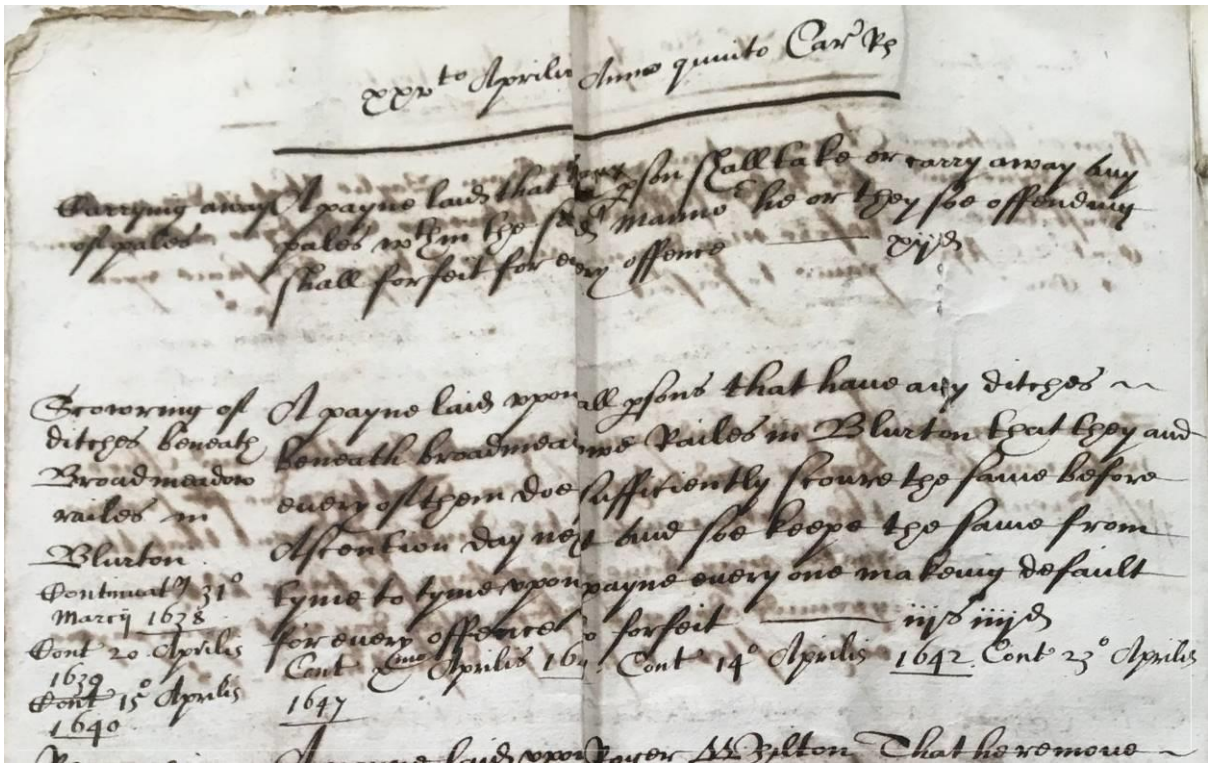


Figure 2.1: Trentham manor court papers, 1629, SRO D593/J/7/3/1

Manor rolls such as Trentham's frequently include entries regarding the scouring of ditches because if they were not kept clear, ditches could easily become blocked and overflow.[32] This was not always a risk just to the owner's lands but could transgress boundaries to affect neighbouring land as well. The pains in the Trentham records contain frequent orders to scour ditches, often including a deadline by which ditches must be scoured (Table 2.1). In 1629, 1631, 1638, 1639, 1640, 1642 and 1647 this deadline was the Feast of Ascension. As

[31] SRO D593/J/7/3.

[32] Recently, Ruiz has modelled the impact of agricultural changes on flow generation, soil erosion and sediment:
Veronica Escobar Ruiz, "The Effects of Changes in Agricultural Land Use , Management Practices and Landscape Features on Catchment Flow and Sediment Generation" (University of Liverpool, 2018).

the manor court was normally held during April, and Ascension fell in late May or early June, this gave the inhabitants approximately a month to scour their ditches or face a fine. Midsummer (also the Feast of St John the Baptist) was specified on three occasions, each instance allowing over two months (scouring ditches in 1636 and for both scouring ditches and repairing a causeway in 1641). At the other extreme, a period of eight days was allowed in 1633. It is impossible to tell whether these variations in deadline reflect the perceived severity of any drainage problems and difficulty of the task ordered, of whether they merely reflect another, unseen, factor. However, they are outliers, and usually a little over a month was considered enough for the task ordered.

Table 2.1: Deadlines for work ordered by Trentham manor court
In brackets are continuations of previous pains

Court date	Action	Deadline (feast day)	Date	Length of time
1 May 1623	Scour ditches	Whitsun/Pentecost	4 June	34 Days
25 April 1629	Scour ditches	Ascension	24 May	29 Days
21 April 1631	Scour ditches	Ascension	29 May	38 days
7 April 1632	Scour ditches	Mayday	1 May	24 days
23 April 1633	Scour ditches	Mayday	1 May	8 days
23 April 1633	Scour ditches	Whitsun/Pentecost	15 May	22 days
20 April 1636	Scour ditches	Midsummer	24 June	65 days
(31 March 1638)	(Scour ditches)	(Ascension)	(13 May)	(43 days)
(20 April 1639)	(Scour ditches)	(Ascension)	(2 June)	(43 days)
15 April 1640	Scour ditches	Whitsun/Pentecost	27 May	42 days
(15 April 1640)	(Scour ditches)	(Ascension)	(17 May)	(32 days)
10 April 1641	Scour ditches	Feast of John the Baptist	24 June	75 days
10 April 1641	Repair causeway	Feast of John the Baptist	24 June	75 days
(10 April 1641)	(Scour ditches)	(Ascension)	(9 May)	(29 days)
(14 April 1642)	(Scour ditches)	(Ascension)	(29 May)	(45 days)
(23 April 1647)	(Scour ditches)	(Ascension)	(30 May)	(38 days)

In 1631, the pain was set at twelve pence for occupiers of the land around the lake who did not comply. However, it was more frequent for ditches "below Broadmeadow" to be specified, with the usual pain being three shillings and four pence if the work was not completed. Similar offences carried the same penalty, including failure to maintain hedges or other forms of water management. For example, in 1636 Lawrence Bradwell was ordered to keep the water from flooding the "apple tree fields" on pain of three shillings four pence.[33] The frequent occurrence of this sum suggests that it was a standard pain for negligence that could cause public nuisance.

[33] SRO D593/J/7/3/1.

Negligence was not the only abuse of water systems that the manor court was concerned with. Fishing in the Trent carried penalties of up to ten shillings, far higher than failing to scour ditches. However, many of these pains were a form of tax (rather than punishment) in exchange for a privilege,[34] and it is not always easy to distinguish which pains are punishments, and which are the price of a privilege. It seems reasonable that fishing might sometimes be allowable but polluting the river might not, though this is far from certain. "Watering" or washing hemp or flax carried a relatively minor pain of twelve pence, however carcasses and carrion were considered far more noxious. Leaving carrion or carcasses in running water carried the steep penalty of up to ten shillings. A male farm labourer's wages in England in the 1630s were typically between eight and a half and nine pence per day (or around eleven pounds per year).[35] Ten shillings could therefore represent thirteen or fourteen days' wages for many people, so would have been a formidable deterrent against polluting water supplies.

Pollution is often characterised as an urban problem, in both popular consciousness and in the contexts in which it has been studied. Jenner has studied water pollution in a metropolitan context,[36] and Fay has examined health and sanitation in early modern Norwich.[37] It is easy to imagine that the crowded centre of London or other towns such as Norwich struggled with sanitation and pollution. However rural areas and small towns and villages were not necessarily a clean, natural idyll either and Trentham manor court saw the need to use heavy fines to maintain a clean supply of water. King's study of Prescott demonstrates how waste could be a problem in a small town, although the problem was often that dung caused an obstruction or was a nuisance, rather than being viewed as a public health matter.[38] King finds many examples of fines of three shillings and four pence for nuisances such as leaving dung piled in front of houses, with steep fines similar to those in Trentham for serious cases and serial offenders.

[34] King, "How High Is Too High? Disposing of Dung in Seventeenth-Century Prescot," 444–45.
[35] Gregory Clark, "The Long March of History: Farm Wages, Population , and Economic Growth, England 1209–1869," *Economic History Review ,* 60, no. 1 (2007): 99–100.
[36] Jenner, "Monopoly, Markets and Public Health: Pollution and Commerce in the History of London Water 1780-1830."
[37] Fay, *Health and the City: Disease, Environment and Government in Norwich, 1200-1575*.
[38] King, "How High Is Too High? Disposing of Dung in Seventeenth-Century Prescot."

These pains indicate that the manor court was concerned enough to regulate ditches, fishing, and pollution. However, setting a pain and enforcing it were two separate issues. Polluting water with carrion does not appear in the estreats of fines,[39] suggesting either that it was not often enforced or that there were few, if any, instances when someone disobeyed the order. The latter seems more likely, as the weight of the fine suggests it was an issue that was taken very seriously and Waddell observes that the bylaws of the court were enforced through monitoring by neighbours.[40] There is one instance in 1647 of three individuals, Alice Baylie, Margaret Bradwell and Roger Whitton, being fined for washing flax or hemp in running water. However, each of the three was only fined seven pence rather than the full twelve that was possible, suggesting some leniency on the part of the manor when transgressions did occur. The fines stated may have been set to motivate the residents of Trentham into compliance, but not often used as a punishment to enforce behaviour.

However, attention to an area by the court reflects more than just whether it was prone to flooding. The role of the manor court was management of the manor. Preventing flooding was only of concern if it affected the functioning of the manor, by obstructing roads or causing tension between neighbours. This therefore included the mill, which all residents were required by the manor to use for their flour or be fined. Almost continuous estreats of fines have survived for 1722 to 1746,[41] providing a chance for comparison with the records from the 1620s to 1640s. Of ninety-seven fines for failure to scour ditches in them, sixty-five describe a ditch in relation to, or "adjoining" a road or lane. This could be because roads and lanes were identifiable, nameable features, however it is more likely that it is because maintaining roads and lanes were an important part of the function of the manor. Of the thirty-two cases where a road or lane is not identified, either a neighbour's land or common land adjoining the ditch in question can be positively identified in nineteen of them (with some cases being unclear). The manor court was not likely to become involved when the issue was entirely within a person's own land and did not affect their neighbours or the community. The manor regulated the scouring of ditches when a blocked or

[39] SRO D593/J/7/3/1.
[40] Waddell, "Governing England Through the Manor Courts, 1550-1850," 280.
[41] SRO D593/J/7/4/3.

overflowing ditch caused a nuisance and preventing flooding of roads was a particularly important concern.

While there is no evidence of fines being enforced for ditches in need of scouring in the 1630s and 40s, there are times in which people were fined for diverting watercourses or allowing flooding to occur. An earlier entry, mixed in with the disordered seventeenth-century records, shows John Wood being fined six shillings and eight pence for "turning the water out of the right course" on Lightwood Heath in 1566, although this is a paltry sum compared to the twenty shillings Anna Hunt was fined in 1615 for the same offence in Longton. The order in 1636 that Lawrence Bradwell should keep apple tree fields from flooding was either disobeyed or impossible as in 1637, Bradwell was fined the full three shillings four pence that had been stated in the pain. Clearly, disrupting the flow of water and causing flooding was serious enough to warrant enforcing fines, sometimes quite heavy ones. However, ditch scouring and cleansing was either routinely completed or not always enforced. The Trentham manor rolls resume a century later, again showing regular orders to clear ditches and gutters. The records for 1715 show a lengthy list of orders for scouring ditches, with fourteen entries giving specific details of ditches and their locations, and the names of who needed to clear them. The fines are mostly either five or ten shillings, although Henry Mountford, Arthur Braddock and John Bold were all ordered to scour "their respective parts of the ditch from the little field to John Bolds new croft" on pain of thirteen shillings. Wages were not much higher than they had been in the early decades of the seventeenth century, with daily wages for labourers at around ten pence a day,[42] but the penalties for risking flooding by neglecting to scour ditching were far higher.

In most years present in the eighteenth-century records, failure to scour ditches occurs at least once, with the fines being enforced at five or ten shillings, usually the latter. The biggest difference between these and earlier records is that ditches and hedges were almost always paired together, with a typical pain being for "not cutting [his/her] hedges & scowering [his/her] ditches." Some names and places recur several times suggesting a particularly problematic place or person. Most intriguingly, Ann Dalton was fined five shillings every year from 1726 to 1732 for not scouring her ditches in the highway lane.

[42] Clark, "The Long March of History: Farm Wages, Population , and Economic Growth, England 1209–1869," 99–100.

There is no indication about who Ann Dalton was or why her ditches were such a recurring problem. She is described once as "Widow Dalton," but this does not necessarily indicate anything about her age or whether she did or did not have any family or help to rely on, although a George Dalton also appears in the rolls. She may have struggled to complete the work, or simply not been willing to undertake it. Other individuals reappear repeatedly just as Ann Dalton does, including John Mare, John Greatback, Sarah Hill, John Poyser and several others. Potentially, serial offenders such as these could be traced using standard genealogical sources to verify anything about their personal circumstances, such Ann Dalton's age and likelihood of being unable to scour her own ditches. Unfortunately, neither she nor any of the other repeat offenders were found through these means (although one George Dalton did marry a Katharine Fenton in Trentham in 1720[43]). As a result, it is currently impossible to determine for certain whether these cases reflect problematic land, negligent individuals, or both.

Sometimes multiple members of the same family appear several times over, the biggest culprits being the Elkin family. As previously stated, the "community" was not necessarily a stable entity in this period, with more transience than has at times been assumed,[44] but families such as the Elkins who reappear repeatedly likely represent the wealthier, more established (and less transient) members of the local population. Richard Elkin first appears in 1737, fined ten shillings for not cutting his hedges and scouring his ditches adjoining a lane leading from Cocknages to Newstead. Between then and 1745, his name appears twelve times, with fines totalling five pounds and fifteen shillings. George Elkin was fined seven times across the same period for "not making good Hedges and Ditches" on his lands, with fines each time of one pound, ten shillings (making a poor ditch was clearly a worse offence than failure to maintain an existing one). Meanwhile, George Elkin the younger appeared twice in 1740 and 1741 for failure to scour ditches and cut hedges, each time being fined the typical ten shillings. In addition, a Thomas Elkin appears in the manor rolls for failure to repair lanes. The impression given is of a family with a habit of avoiding responsibility to the wider community, despite efforts by the manor to enforce the need to

[43] Ancestry.com, "Ancestry.Com. England, Select Marriages, 1538–1973 [Database on-Line]. Provo, UT, USA: Ancestry.Com Operations, Inc., 2014.," 2014.
[44] Sharpe, *Crime in Early Modern England 1550-1750*, 103–4; MacFarlane, *Reconstructing Historical Communities*.

ensure ditches were kept clear and well maintained, though their repeated appearance could also be explained if they were large land owners or owned an area of land particularly prone to flooding.

Some areas were clearly more problematic than others. As ditches seldom have their own names, they are described by the land they are on. In the first half of the seventeenth century, many of the pains are for ditches "below Broadmeadow," which had previously appeared in 1631, suggesting this was an area particularly prone to problems. One place that appears with great regularity in the eighteenth century is New Inn Mill (Figure 2.2). Although Broadmeadow could not be located, there is still a former mill (now holiday rental) called New Inn Mill where New Inn Lane crosses Longton Brook (Figure 2.4).[45] There was a causeway near the mill, in New Inn Lane, which needed repairing on several occasions. In 1728 and 1729 Henry Robinson was fined ten shillings for not repairing it, while William Gent was fined ten shillings in 1730 and 1737 for not repairing a causeway between Oxhays and New Inn Bridge. The issues around New Inn Mill extend further, as there are several fines across the period for not scouring ditches around the mill (George Dalton in 1736 and Thomas Bold almost every year from 1738 to 1743). In 1739, William Mare was fined ten shillings for "not farming his part of the watercourse" between Longton Mill and New Inn Mill. The same fine was levied in 1740 for the same watercourse, this time against Francis Shelley, Thomas Wilson, Samuel Barker, William Brough and Richard Elkin. Then in 1741 Randle Shelley was also fined ten shillings, again for not farming the watercourse between Longton Mill and New Inn Mill. It is possible that "farming" refers to clearing reeds and weeds from the channel to allow the water to flow freely. While reeds and rushes were a valuable resource, Morgan notes that they could also be "trash" that needed clearing for proper use of land.[46]

[45] https://www.booking.com/hotel/gb/the-new-inn-mill-stoke-on-trent.en-gb.html
[46] Morgan, "Flooding in Early Modern England: Cultures of Coping in Gloucestershire and Lincolnshire," 68.

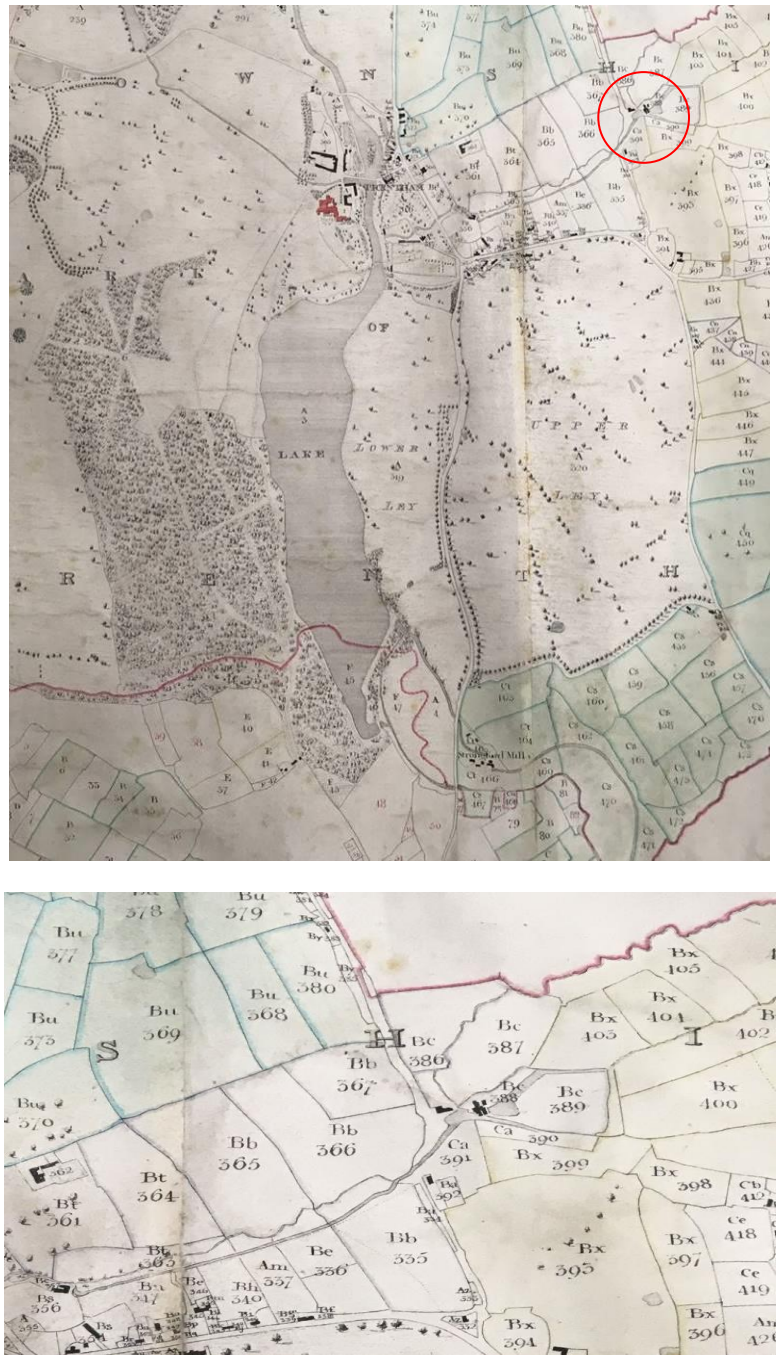


Figure 2.2: Map of the Marquis of Stafford's Trentham estate 1809 and detail of the location of New Inn Mill[47]

[47] SRO D603/H/3/444.

Figure 2.3: Trentham Lake and River Trent: alterations to banks and course at Trentham c.1851-1900[48]

[48] SRO D593/H/13/70-79.

Figure 2.4: Present day New Inn Mill (top right) and the intersection of New Inn Lane and Longton Brook[49]

Keeping ditches and watercourses clear to allow water to drain freely was not the only concern, as water also needed to flow consistently to the mill. Heavy fines were issued to anyone turning water away from the mill, in 1741 John Fleming was fined two shillings and six pence for not returning water running from "Hom Heath" (Hem Heath) to its "old right course to New Inn Mills." By 1743, this relatively small fine was replaced by the much weightier one pound, nineteen shillings and eleven pence, sixteen times the value of the original fine. The initial light fine was a warning, perhaps making allowances for Fleming's own need for the water. However, when he failed to comply with the original ruling, the fine very quickly became quite punitive.

Manor court records can be incredibly useful for understanding flooding, drainage, water management and sanitation on a local scale. As some issues arise repeatedly, they provide insights into specific problems and areas prone to flooding, such as the ditches "below Broadmeadow." They can also give an impression of the different personalities,

[49] Google Earth Pro version 7.3.2.5776, 52°58'07.71" N, 2°11'19.57" W.

relationships, and networks of people in the community, particularly those repeatedly fined for neglecting their duties. These personalities can be enticing, but with only minimal information given, reading too much into them should be avoided (as with Ann Dalton). The manor court (as with any court) was also unlikely to become involved in an issue affecting only one person's land. Ditches appear regularly not just because of their tendency to become blocked, but because they often form a part of boundaries along roads and the edges of fields. This meant they could become a problem for several individuals or even the whole community when more than one person's property was affected, or roads were damaged.

2.2.2 Quarter Sessions and Assizes

While most of the watercourses in manor courts are ditches, streams, brooks or pools, Quarter Sessions often feature rivers. As the court was responsible for enforcing criminal law, court records feature indictments against those breaking statutes against fishing or stealing fish, as they do in manor courts (2.2.1 Manor courts). However, the civil functions of the court provide greater material for histories of water. As with manor courts, many cases involve boundaries or impact on infrastructure. Quarter Sessions sometimes regulated the maintenance of riverbanks. As a body responsible for highways and infrastructure, they more frequently ordered the repair of bridges, causeways, and roads. Often, the maintenance of bridges was the responsibility of landowners, and had been for centuries - it was one of the three duties held by all landowners in Anglo-Saxon England.[50] However, in 1531 the Statute of Bridges placed the burden of maintenance on the county, and thus the Quarter Sessions (in the absence of any traditional duty on a person, town parish or other body). The statute required that at least four justices should enquire into any reports of bridges in decay and take proceedings against whoever was responsible for

[50] F. G. Emmison and Irvine Gray, *County Records* (London: George Philip and Son Ltd. for The Historical Association, 1948), 9.

repairing them, including the county. They were also empowered to appoint two surveyors of bridges and levy a county rate for the repairs.[51]

In Staffordshire the Quarter Sessions rolls have survived from 1581 onwards (although the rolls are only one portion of the Quarter Session material). The courts were held four times a year, each one associated with a legal term. Easter sessions were in April or May, depending on the date of Easter that year. The Trinity sessions were in July, and as Trinity was the first Sunday after Pentecost, or eighth after Easter, the Trinity sessions were approximately eight weeks after the Easter sessions. This was the case until 1642 when the Trinity sessions became the Translation sessions as it was ordered that they would be held the Tuesday after the Feast of the Translation of St Thomas Becket on the seventh of July.[52] Autumn sessions were in late September to early October, associated with Michaelmas. The final sessions of the year were held in early January, close to Epiphany on the sixth of the month.[53] Thus, the Quarter Sessions were not completely evenly spaced through the year, with variations in the date of Easter and the shorter period between Easter and Trinity. Nevertheless, they do provide a regular record that could reflect seasonal variations in damage to infrastructure.

On very rare occasions, cases were taken as far as the Assize court. By the late sixteenth century, the Assizes wielded considerable administrative and political power in addition to trying virtually all felony.[54] Through the seventeenth century, most cases involving management or maintenance of water systems were not serious enough to warrant being held until the next Assizes and were dealt with by the Quarter Sessions. However, particularly challenging cases sometimes needed higher mediation and were assessed by the Assize judges if the Quarter Sessions had failed to resolve the issue.

[51] Emmison and Gray, 9.
[52] SRO Q/SR/250.
[53] Until 1750, new year was at the end of March.
[54] Cockburn, *A History of English Assizes 1558-1714*, 3.

2.2.2.1 Riverbanks

Failure to maintain riverbanks was sometimes reason for indictment in the Quarter Sessions, usually when flooding caused damage and the landowner was believed to be negligent. In July 1657 one Humphrey Hall of Doveridge was indicted for causing flooding by not maintaining the bank of the Dove, which formed the boundary with Derbyshire.[55] The legal basis for many rulings about water were based on a combination of prescriptive rights (based on a long existing use) and natural rights. Through much of the fifteenth and sixteenth centuries, prescriptive rights underpinned water rights doctrine, for example a mill needed to claim ancient use of water or *antiquum molendinuum* (literally: "ancient mill") if right to water was disputed.[56] Getzler demonstrates that in the sixteenth century, prescriptive and natural rights were intermingled , and in the seventeenth century natural rights began to solidify as the basis for many claims, such as to unpolluted air.[57] The two can be challenging to separate, but the prevalence of "ancient" among rulings such as over the Dove demonstrates an appeal to the past and a claim of how things "should" be.

However, a naturally shifting river like the Dove was challenging for any claim based on a sense of continuity. Because of its status as county boundary, maintaining the Dove was a difficult issue. In 1659 one Elizabeth Broughton of Broughton, spinster, and one Richard Wall of Doveridge, were indicted as Humphrey Hall had been.[58] On this occasion, flooding had altered the flow of the River Dove. As "the whole course of the water of the River Dove for the time whereof the memorie of man is not contrarie hath continually divided & separated except at flood the counties of Stafford and Darbie,"[59] the same principles of establishing the flow of water "in memoriam" are being considered as they would in disputes over ownership. The river was the ancient and natural county boundary and it needed to be maintained as such. Further, the jurors heard specifics of the flood defences that were needed to maintain the banks and the course of the Dove:

[55] SRO Q/SR/299/85.
[56] Getzler, *A History of Water Rights at Common Law*, 117.
[57] Getzler, 117–22.
[58] SRO Q/SR/306/61 and SRO Q/SR/308/3.
[59] SRO Q/SR/308/3.

> […] there hath been & ought to be a sufficient defence & bank of earth piles & trense in and of the bredth of eight yards at the least, and in & of the length of eight yards at the least and in and of the depth or thicknesse of one yard & twoe foote at the least to be made upheld repaired and kept at the southwest end of the said Busbeys little close from time to time[60]

As "the said defence & banks" had fallen into disrepair, the river had ceased to be a sufficient boundary. However, the pair pleaded their innocence and they were ordered to attend the next Quarter Sessions. The status of the Dove as a county boundary between Uttoxeter and Doveridge was potentially even more troublesome than a couple of court cases suggest. The present-day county boundary aligns with the river, however aerial photography shows signs of several potential previous channels, and the nineteenth-century Ordinance Survey County Series maps show the river following a different course from the current one – with the current river meandering in some places more dramatically than in the nineteenth century (Figure 2.5).

[60] SRO Q/SR/308/3.

Figure 2.5: County boundary (red) between Doveridge and Uttoxeter with nineteenth century ordinance survey county series overlaid on modern aerial imagery[61]
The county boundary follows the course of the river, but the nineteenth-century map shows a different channel.

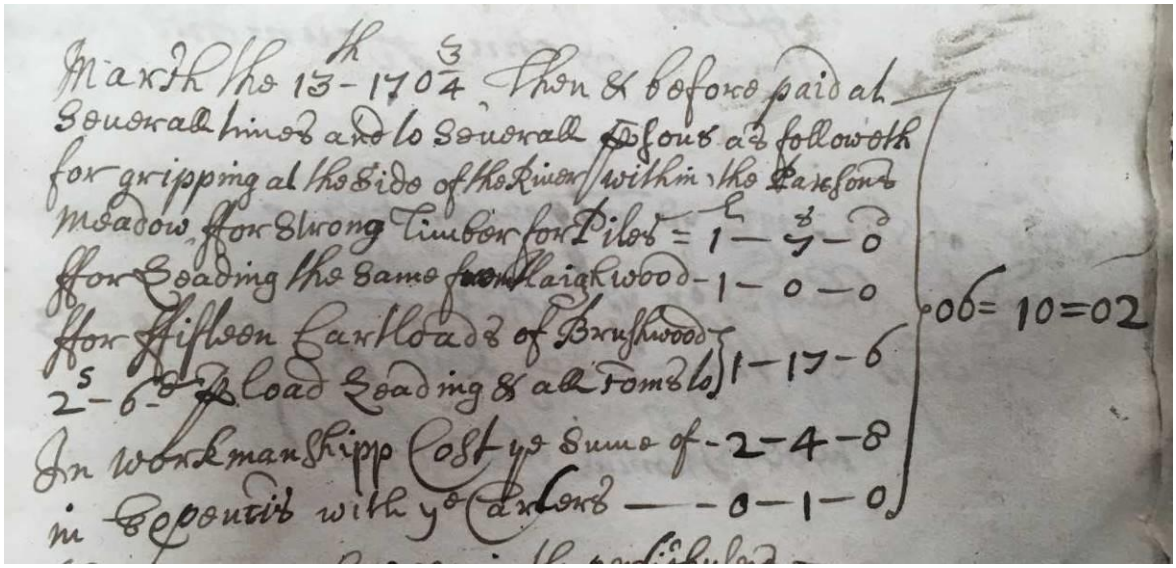
Earth banks were not the only defence available to maintain riverbanks. However, descriptions of flood defences, or repairs to flood damage, can be scarce among the types of records consulted for this thesis. Courts resolving disputes or indicting people for negligence infrequently feature riverbanks and were more concerned with establishing responsibility for maintenance than describing the flood defences involved. When official

[61] 1:2500 County Series 1st Edition [TIFF geospatial data], Scale 1:2500, Tiles: derb-04715-1 - derb-05309-1,staf-02614-1 - staf-03309-1, Updated: 30 November 2010, Historic, Using: EDINA Historic Digimap Service, <https://digimap.edina.ac.uk>, Downloaded: 2019-05-12 17:30:26.549.
High Resolution (25cm) Vertical Aerial Imagery [JPG geospatial data], Scale 1:500, Tiles: sk0729-sk1835, Updated: 5 November 2017, Getmapping, Using: EDINA Aerial Digimap Service, <https://digimap.edina.ac.uk>, Downloaded: 2019-05-12 17:29:17.734.

bodies gave accounting for repairs, such as in Rugeley Parish Officers' book[62] or the Quarter Sessions, they list costs, but not always materials or specifications for the repairs. Morgan does note instances of raising riverbanks and erecting banks (potentially like that described on the Dove) to reclaim land in the Humber estuary,[63] but description of *how* riverbanks were maintained are rare.

However, the accounts of Wigan rectory from 1703-4 provide some clues regarding flood defences (Figure 2.6). The accounts list six pounds, ten shillings and two pence for materials and labour for "gripping" the riverbank, including strong timber and fifteen cartloads of brushwood. This appears to be an attempt at bank stabilisation, to make the bank "grip" together, although in modern land management gripping usually refers to the creation of drainage channels.[64] It is likely a kidweir, described by Lord and Salisbury from written and archaeological evidence.[65] They were composed of lines of posts with brushwood and wattle, and used to stabilise river beds and banks, facilitate water flow, improve navigation and prevent flooding.[66] Although Wigan is not within Staffordshire, it is possibly that they were used in Staffordshire and kidweirs are recorded along the Trent as early as 1316, with examples near Nottingham carbon dated to from the mid-fifteenth to late-seventeenth centuries.[67] The materials listed in Wigan fit the description of kidweirs, with the brushwood and the timber for the "piles" providing the posts, and the presence of similar river defences in Staffordshire is likely.

[62] SRO D3243/4/1.
[63] Morgan, "Flooding in Early Modern England: Cultures of Coping in Gloucestershire and Lincolnshire."
[64] RSPB, "Moorland Gripping | Advice For Farmers," accessed January 27, 2021, https://www.rspb.org.uk/our-work/conservation/conservation-and-sustainability/farming/advice/techniques-to-help-wildlife/moorland-gripping/.
[65] Philip Lord and Chris Salisbury, "Brush-Piling: Eighteenth Century Engineering in an American Wilderness," *Industrial Archaeology Review* 19 (1997): 55–56.
[66] Lord and Salisbury, 55–56.
[67] Lord and Salisbury, 57.



March the 13th – 1703/4 then & before paid at several times and to several persons as followeth

For gripping at the side of the River within the Parsons Meadow for strong Timber for Piles	=	1l	-	7s	-	0d	
For loading the same from Haighwood	-	1	-	0	-	0	} 06 = 10 = 02
For Fifteen Cartloads of Brushwood 2s-6d p[er] load Loading & all Coms to	}	1	-	17	-	6	
In workmanship cost [th]e sume of	-	2	-	4	-	8	
in expenses with [th]e carters —	-	0	-	1	-	0	

Figure 2.6: Extract from *Account of revenues and disbursements from the revenues of Wigan Rectory,* with transcription[68]

Riverbanks were the responsibility of whoever had tenure of the land that bank was part of. The records concerning riverbanks or banks of meres found in the Staffordshire Record Office tend to be concerned with the role of the water as a boundary, as this is when they were most likely to become the focus of a dispute and the records consulted here have largely been from disputes or court proceedings.

2.2.2.2 Bridges

Bridges presented maintenance issues distinct from those of ditches, drainage, or riverbanks. They provide passage over rivers which could otherwise be impassable obstacles, and when destroyed through a disaster or wear and tear (or lack of maintenance) they can cause disruption for entire communities. This can be as true in the present as it was in the early modern period: during the flooding of December 2015, "Storm Frank" destroyed Tadcaster Bridge in North Yorkshire effectively cutting the town in two and

[68] SRO D1287/Add III/3.

causing disruption for a year as residents had to take a ten-mile detour until the new bridge was opened.[69] It is easy to imagine that without the benefit of cars, navigating around a destroyed bridge was likely to be even more disruptive to past communities if other forms of transport (such as boat) were not practical.

While references to riverbanks in Staffordshire's Quarter Sessions are sparse, bridges appear frequently. There are at least 134 sessions between 1586 and 1750 dealing with at least one damaged bridge. Between 1550 and 1750, the Staffordshire Quarter Sessions saw some seventy accounts and other records regarding financing bridge repairs, sixty-four presentments about damaged bridges, sixteen writs summoning inhabitants, twelve petitions, twelve indictments, ten orders for repairs or levying money, ten certificates or reports to the court reporting the state of a bridge, nine testimonies, four agreements for repair, and several other records regarding damage or repair to bridges. These 213 records represent only the bridges that came to the attentions of the court, and it is likely that they represent the cases where obligations were either unclear or avoided altogether, or where costs were a significant obstacle to successfully repairing a bridge. Many more cases may have been managed by manor courts, settled extra-judicially or the repairs were simply undertaken with no issue. Records of these may not survive, depending on the survival of individual manors and estate records, and repairs undertaken with no issue might not leave any record at all.

[69] "UK Floods: Moment Tadcaster Bridge Collapsed," BBC News, December 29, 2015, https://www.bbc.co.uk/news/av/uk-35195153/uk-floods-moment-tadcaster-bridge-collapsed; "Storm Frank: Tadcaster Evacuated as Bridge Partially Collapses - as It Happened," The Guardian, December 29, 2015, https://www.theguardian.com/environment/live/2015/dec/29/uk-floods-more-gales-and-downpours-forecast-as-cleanup-continues-live-coverage?page=with:block-5682cf28e4b0028ce5164737#block-5682cf28e4b0028ce5164737; "Tadcaster Reconnected as Bridge Severely Damaged by 2015 Floods Reopens," The Telegraph, February 3, 2017, https://www.telegraph.co.uk/news/2017/02/03/tadcaster-reconnected-bridge-severely-damaged-2015-floods-reopens/; "Tadcaster Bridge Re-Opening after 2015 Boxing Day Floods," BBC News, February 3, 2017, https://www.bbc.co.uk/news/av/uk-38852712/tadcaster-bridge-re-opening-after-2015-boxing-day-floods.

Table 2.2: Records of bridges in the Staffordshire Quarter Session rolls

	Epiphany	Easter	Trinity	M.mas	Unknown	Total
Accounts and financial	18	11	17	24		**70**
Presentments	23	11	22	8		**64**
Writs	3	3	2	8		**16**
Petitions	2	2	5	2	1	**12**
Indictments	3	2	2	5		**12**
Orders	1	3	4	2		**10**
Certificates and reports	2	1	4	3		**10**
Testimonies	2	3	4			**9**
Agreements			2	2		**4**
Miscellaneous	1	2	1	1	1	**6**

Few of the records in Quarter Sessions mention flooding. In four instances flooding was described as a cause of or contributing factor to damage to a bridge (Table 2.3). In another, flooding was not the cause of damage, instead the concern was that a damaged bridge would be more perilous to travellers during flooding. Unfortunately, in the latter case there is no further detail other than that, "the wodden bridge in Trentham is in disray to the danger of travellers passing that way in times of great floods."[70] Given the drownings evident from Alrewas, it is easy to see how a damaged wooden bridge could become slippery and dangerous during a flood.

Table 2.3: Bridges damaged by or dangerous due to flooding in the Staffordshire Quarter Sessions rolls

Reference number	Session	Record	Brief description
Q/SR/215	Trinity 1634	Certificate of damage	Damage to Salter's Bridge by flooding of River Mease
Q/SR/293/4	Epiphany 1656	Petition by the inhabitants of Combridge	Flooding on the road between Uttoxeter and Ashbourne and assistance needed from the county to maintain the bridge across the area where the water flows
Q/SR/381/6	[nd] 1680	Notes	Wooden bridge in Trentham damaged and dangerous for travellers during floods
Q/SR/479/8	Trinity 1711	Presentment by Grand Jury	Stone Bridge on the road between Stafford and Bridgenorth in Brewood out of repair, and the bridge on Watling Street on the road between London and Chester also damaged due to floods
Q/SR/482/30	Easter 1712	Testimony	Local inhabitants of the north part of the Totmonslow Hundred, requesting that Wall Bridge over the River Churnett on the road from Leek to Newcastle be replaced by a stone bridge due to floods making the road impassable

It is not always evident from the sessions rolls what stage the repairs are when an entry appears: whether the issue has only just arisen, the repairs are being undertaken, or whether they have been completed. The reasons for the damage are also rarely mentioned, and the date that the problems occurred or were identified is almost never given. This can

[70] SRO Q/SR/381/6.

make handling the data from the Quarter Sessions problematic, as it is not clear when or how damage occurred, or when the work to repair it was undertaken. Instead, the only indication for most cases is the sessions in which the bridge is mentioned.

It is also rarely clear from the Quarter Sessions alone what the bridges were made of, how large they were or any other features of their design. Sometimes there are indications of the construction of the bridge – in Combridge the existing and insufficient bridge being replaced in 1656 was a "pole,"[71] in Trentham in 1680 there was a wooden bridge,[72] and 1712 Wall Bridge (presumably wood) was impassable in floods and intended to be rebuilt in stone.[73] Minimal as this information is, it does show instances of bridges being deemed inadequate and rebuilt to withstand and be usable during floods. This material can be supplemented with evidence from other sources. Parish registers such as Alrewas occasionally describe particularly noteworthy landmarks, such as a note about the Trent bridge made some time after the flood of 1795 in Alrewas parish register:

> next to Westminster Bridge is thought by some persons to be the finest in England. It is built of squared free-stone, is almost a quarter of a mile in length and consists of 37 arches. It was damaged [he…] 1795[74]

In Shugborough, the distinctive shape of the cutwaters of Essex Bridge can be seen in both eighteenth-century plans of the estate (Figure 2.7). The bridge itself is a packhorse bridge dating at least to the seventeenth century, and likely to the sixteenth, and has since then remained largely unchanged.[75] However, both these examples are of well-known landmarks. The history of Trent Bridge is particularly well documented,[76] and the Trent Bridge is a Grade II listed building while Essex Bridge is a scheduled monument. This still leaves a lack of source material for the construction of lesser known and smaller bridges, while the easiest bridges to find source material for are the ones for which there is already

[71] SRO Q/SR/293/4.
[72] SRO Q/SR/381/6.
[73] SRO Q/SR/482/30.
[74] SRO D783/1/1/1.
[75] Historic England, "Essex Bridge, Great Haywood, Colwich" (Historic England), accessed June 17, 2019, https://historicengland.org.uk/listing/the-list/list-entry/1006111.
[76] Historic England, "Trent Bridge, Rushcliffe" (Historic England), accessed June 17, 2019, https://historicengland.org.uk/listing/the-list/list-entry/1045636; Macdonald, "Reassessing Flood Frequency for the River Trent through the Inclusion of Historical Flood Information since AD 1320."

much known, making it harder to understand how flood damage might relate to bridge construction.

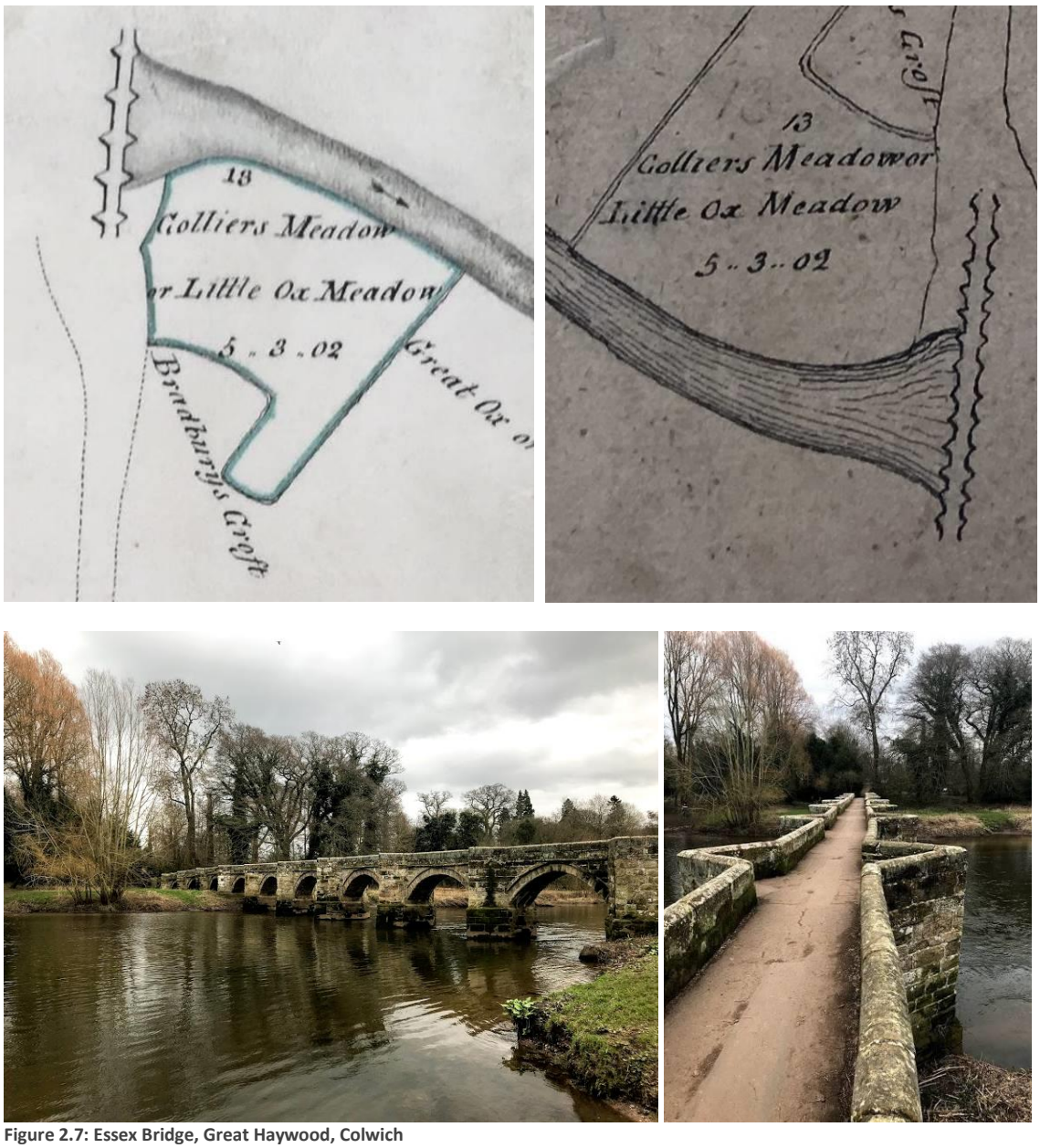


Figure 2.7: Essex Bridge, Great Haywood, Colwich
Plans from 1771 and c.1780, photographs of the bridge in its current state.[77]

A bridge may have been on an individual's land but be used as an important transport route for others, placing responsibility on the landowner for the maintenance and safety of a bridge, as was the case with the causeway near New Inn Mill in Trentham (2.2.1 Manor

[77] Plans: SRO D615/D/10/1 and SRO D603/H/1/2.
Photographs authors own, taken 19th February 2019

courts). In 1653, it was recorded that Hopwas Bridge over the Tame in Tamworth was in disrepair. This is the same site marked as "Hopwas Bridge" on Ordinance Survey Maps in the late nineteenth century, and is still where the A51 (Lichfield Road) crosses the River Tame, connecting Lichfield to Tamworth (Figure 2.8). The current bridge dates from the late eighteenth century,[78] but there has been a stone bridge in Hopwas since at least the reign of Henry VIII (1509-1547).[79] In the summer and autumn of 1653, the bridge was ruled the responsibility of William Comberford, Lord of Wigginton manor.[80] However by autumn the next year it seems the bridge was still not in a sufficient state of repair as the Quarter Session rolls for 1654 show that the owners of Wiggington were once again summoned regarding the repair of the bridge.[81] Again at the Epiphany session of January 1655/6, the owners of Wiggington manor were summoned and held responsible for Hopwas Bridge.[82] From January 1657 responsibility appears to have passed to the new owner, one John Pinsent of Chantry Lane, London.[83]

Pinsent sold the land on, and responsibility continued to be contested, with the new owner reluctant to inherit someone else's problem. This time, the issue was taken further than Quarter Sessions, and was handled by the Lent Assizes in 1658.[84] The Assize court ruled that the previous owner, Pinsent, should be held responsible, as he had never made the repairs ordered in 1657. As Pinsent could not be found (and was no longer in Staffordshire), the county and the new owner, Robert Robotham, were ordered to divide the cost, with Pinsent liable if he were found. The continued failure to resolve issues, and Pinsent moving to beyond the authority of the county, had resulted in the case crossing into the jurisdiction of the Assizes. By October 1660 there were still issues, and Robotham was again ordered by the Quarter Sessions to repair the bridge, and the Comberford family were formally absolved of responsibility as a result.[85] Both Pinsent and Robotham's responsibility for Hopwas Bridge was based on their tenure of Hopwas Hay (Hays wood), and the pontage

[78] Historic England, "Hopwas Bridge, Wigginton and Hopwas - 1279484 | Historic England," 2016, https://historicengland.org.uk/listing/the-list/list-entry/1279484.
[79] E. Jervoise, *The Ancient Bridges of Mid and Eastern England* (Westminster: Billing and Sons Ltd., 1932), 42.
[80] SRO Q/SR/283/59, SRO Q/SR/283/60, SRO Q/SR/284/84.
[81] SRO Q/SR/288/57.
[82] SRO Q/SR/293/54.
[83] SRO Q/SR/297/45.
[84] TNA ASSI 2 1, p.19b.
[85] SRO Q/SR/311/11.

(tolls) they were able to collect from cattle and carriages crossing the bridge.[86] The financial benefit to Pinsent and Robotham from the bridge came with responsibility to repair it. The issues with the bridge seem to have finally subsided after 1663. Two justices of the peace, H. Archbold and J. Pershouse, inspected the bridge and found two bridges in danger of ruin, which the Easter session agreed needed replacing.[87] The new bridge was clearly intended to be substantial, as it was to cost £400 for the Freemason William Evans of Lichfield to build the bridge over two summers. After this, Hopwas Bridge does not reappear in the Quarter Sessions until 1740,[88] although flooding in Hopwas is recorded in 1708 (allegedly due to Oulder Mill stopping the River Tame and not securing the road between Tamworth and Hopwas).[89]

The bridge would have been vital to the village of Hopwas, as the Tame lies between the village and Tamworth, and a damaged bridge would therefore prevent inhabitants from travelling to and from the town. It would also have potentially restricted traffic from Lichfield, Stafford, and Wolverhampton, causing wider problems for the county. However, negligence may not have been the only problem with the bridge, for example heavy traffic such as cattle being taken to and from Tamworth would cause damage over time. Flooding may have been a further cause of damage to the bridge. There are three occurrences of flooding featured in the Quarter Sessions in the 1650s, in 1655 a highway at Coven Heath,[90] in 1656 the road between Uttoxeter and Ashbourne,[91] and the problems with river defences in Doveridge in 1659.[92] If the decade had experienced an increase in flooding, it might manifest in a bridge such as Hopwas seeing more damage. Maps of Hopwas from the late nineteenth/early twentieth show marshy areas to the west of the river, which have not since been built upon (Figure 2.8), and in 2012-13 new flood defences were built near Hopwas Bridge.[93] Hopwas' name does suggest an ancient vulnerability to flooding. "Hop"

[86] SRO Q/SR/311/11.
[87] SRO Q/SR/321/3.
[88] SRO Q/SR/576/8.
[89] SRO Q/SR/471/14.
[90] SRO Q/SR/292/58.
[91] SRO Q/SR/293/4.
[92] SRO Q/SR/308/3.
[93] "Lower Tame Flood Risk Management Strategy - GOV.UK," accessed December 6, 2018, https://www.gov.uk/government/publications/lower-tame-flood-risk-management-scheme/lower-tame-flood-risk-management-strategy.

referred to an enclosure in a marsh or heathland,[94] while "wæsse" or "was" was related to "wash" and meant a low-lying plain prone to flooding.[95] As a whole, the name referred to an enclosure in fenland and is identified as early as 1086.[96] It is likely that the village had formed on an area that had long been known to flood easily, which would put additional strain on a bridge. Whether they reflect a quirk of local geography or a particularly belligerent series of landowners, the ongoing issues with Hopwas Bridge in 1653-63 were unusually intense, with few such cases being taken to the Assize courts.

Figure 2.8: Hopwas, late nineteenth/early twentieth century County Series First Revision overlaid on present day aerial imagery[97]

Hopwas Bridge epitomises many trends in the repair of bridges throughout the period, showing how a bridge particularly vulnerable to flood damage could become a recurring problem in which boundaries, land tenure and differing jurisdictions played a part in

[94] David Horovitz, "A Survey and Analysis of the Place-Names of Staffordshire, Vol. 1" (The University of Nottingham, 2003).
[95] Horovitz.
[96] David Horovitz, "A Survey and Analysis of the Place-Names of Staffordshire, Vol. 2" (The University of Nottingham, 2003), 380.
[97] 1:2 500 County Series 1st Revision [TIFF geospatial data], Scale 1:2500, Tiles: staf-05905-2,staf-05906-2,staf-05909-2,staf-05910-2, Updated: 30 November 2010, Historic, Using: EDINA Historic Digimap Service, <https://digimap.edina.ac.uk>, Downloaded: 2018-12-05 18:05:07.443
High Resolution (25cm) Vertical Aerial Imagery [JPG geospatial data], Scale 1:500, Tiles: sk1604,sk1605,sk1606,sk1704,sk1705,sk1706,sk1804,sk1805,sk1806, Updated: 5 November 2017, Getmapping, Using: EDINA Aerial Digimap Service, <https://digimap.edina.ac.uk>, Downloaded: 2018-12-05 18:02:53.946

determining who had responsibility for the (sometimes considerable) costs of repair, maintenance and even rebuilding of bridges. Given the frequency with which bridges appear in the Quarter Session rolls, it can be stated that intervention by the county was not unusual in response to problems with bridges, and indeed there are several bridges which, like Hopwas Bridge, appear repeatedly. The appearances of Hopwas Bridge are primarily as testimonies, writs summoning people to court and presentments, as the case had become an apparently quite difficult dispute over responsibility for the bridge. However, issues could be raised in several ways, including through individual complaints or presentments from constables. On some occasions, intervention was requested through a petition by the inhabitants of a parish. Ten petitions from "the inhabitants of" a parish appear in the Quarter Session rolls that were examined, dating between 1552 and 1708, among which four were from 1656 and two from 1652. If the 1650s were a decade which saw many floods, these petitions from parishes requesting assistance to repair bridges may reflect parishes in crisis.

At the Epiphany sessions in 1656, the inhabitants of Combridge petitioned for help twice, including the petition mentioned at the beginning of this chapter. In one, the inhabitants of Rochester and Combridge petitioned together for help with a bridge over the Churnet between the two parishes, however the work was not ordered.[98] In the other, the inhabitants were concerned by flooding on the road between Uttoxeter and Ashbourne:

> w[hi]ch it many tymes in the yeare by force of waters that come from the Hills unpassable, and in frosty weather, by reason of ice, and heretofore there hath not ben any bridge butt a pole w[hi]ch the neighbourhood hath mayntayned Whych being but of small substance is often tymes carried away by floods soe that the passage for the market folks betwixt the townes of Uttoxeter and Ashbourne is utterly hindered.[99]

In this case, the court ordered the building of a horsebridge, and the costs to be "repayed accordingly." In the Translation sessions the same year, the inhabitants of Weston petitioned as the £10 previously assigned for repairs to Weston Bridge were insufficient as the workmen felt the bridge was in danger of collapse and needed rebuilding, costing

[98] SRO Q/SR/293/6.
[99] SRO Q/SR/293/4.

£50.[100] Meanwhile, the bridge between Wednesbury and West Bromwich had also been damaged, and although the two parishes had made attempts at repairing it, they requested help from the county.[101]

These cases show not just a whole parish holding responsibility, but also cases where two parishes shared jurisdiction over a bridge, because the bridge fell on a route between two villages or towns, or because the river was the boundary between the two. This was not only the case at parish level, as counties could share responsibility for bridges. As has been mentioned, flooding of the Dove could disrupt the county boundary. On at least two occasions, bridges were damaged that were part of the boundary between Staffordshire and Derbyshire. In January 1707, a bridge over the Dove between Blore and Thorpe known as Coldwell Bridge was damaged, with estimated cost of £20. It was decided that Staffordshire and Derbyshire would each contribute £10, and any surplus would be used for graveling Hanging Bridge.[102] In 1740 Tutbury Bridge, also over the Dove, was in disrepair, and the court noted that in 1704 it had been repaired by both counties.[103]

Cases such as Hopwas Bridge demonstrate that individuals were sometimes reluctant to shoulder financial responsibility for repairing bridges, particularly if they had inherited the problem. However, bridges were vital transport routes and the county was empowered to provide money for, and order, repairs when needed. This became particularly vital during crises caused by years of poor weather or flooding (as seems to have occurred in the 1650s) when parishes could petition for help if they needed to. To ensure bridges were maintained, bridgewardens were appointed in each hundred[104] in 1685.[105] Even when those ordered to undertake repairs were cooperative, completion was not always straightforward, as in January 1652 when Walter Gould, constable, reported being attacked with a pitchfork and having timber stolen that was intended for repairing several bridges.[106] However it seems that often the issues with bridges arose either from those responsible shirking their duty, or from issues with flooding or wear and tear from traffic that would be

[100] SRO Q/SR/295/15.
[101] SRO Q/SR/295/3.
[102] SRO Q/SR/466/12.
[103] SRO Q/SR/577/23.
[104] A hundred was an administrative subdivision of a county
[105] SRO Q/SR/397/1.
[106] SRO Q/SR/275/3.

expected for a bridge. Complications came from bridges that crossed boundaries, and there are multiple examples of parishes holding joint responsibility for maintenance. This also occurred at county level, as the Dove was the boundary between Derbyshire and Staffordshire, so both counties shared responsibility for the bridges across the Dove.

2.3 Conclusion: The environmental responsibilities of local administration

This chapter has discussed the ways boundaries were managed, infrastructure such as bridges and roads were protected from flooding and responsibility was assigned in the sixteenth to eighteenth centuries. A high proportion of the cases in manor courts relate to drainage and the requirement for people to scour their ditches, with orders for scouring usually allowing about a month for the inhabitants of the manor to comply. Examining these pains can be useful for examining both sanitation and flooding as the court was responsible for preventing pollution and flooding while enforcing the maintenance of drainage. Repeated issues can reveal areas prone to flooding and individuals who avoided their responsibilities, although it does not show whether the latter was due to negligence or an inability to undertake the required work. Problems were most likely to appear in the manor courts when they transgressed boundaries, whether by damaging infrastructure and common land, or by damaging a neighbour's property.

While manor court records can be useful for examining these issues at the level of small communities, Quarter Sessions and Assizes can reveal issues at county level. While manor courts are useful for understanding issues with streams, brooks, ditches and pools, Quarter Sessions (and occasionally Assizes) reveal more about rivers. Rivers such as the Dove could form boundaries but erosion, flooding, and changes to the channel of a river could threaten the status of the river as a boundary. It also presented difficulties with jurisdiction, as the river itself transcended the boundary. Therefore, maintenance and repair of damage to riverbanks and bridges could fall under multiple jurisdictions. Although Quarter Sessions can be frustratingly brief, the legal processes involved required regular record creation and the cases that are lacking in detail are counterbalanced by others that provide insight into flood defences and the materials, cost or time required for repair work.

Court records are only one form of local administration, and there are many other administrative sources that can be useful for environmental history. This has been demonstrated with commissions of sewers and parish registers.[107] In most cases (parish registers are an exception) their utility comes from two characteristics of the material. First, as demonstrated here with court records, local administration involved managing issues to which the environment is inherently important, such as agriculture or infrastructure. Second, regular administrative or legal process are involved which result in a regular series of records. This chapter has focused mostly on their value as a form of qualitative data, but the Chapter 4 will demonstrate that they can be used in forms of quantitative analysis.

[107] Veale, Bowen, and Endfield, "'Instead of Fetching Flowers, the Youths Brought in Flakes of Snow': Exploring Extreme Weather History through English Parish Registers"; Morgan, "Flooding in Early Modern England: Cultures of Coping in Gloucestershire and Lincolnshire."

3 : Records of Estates and Individuals

> The Lessee may as water shall be scarce and wanting in the pool belonging to the mill to draw up the floodgates and let down and make use of the water in the upper pool called Freeford Pool (except when the same shall be scouring or cleansing) in order to enable the working and grinding of the mill nevertheless not taking up the sills belonging to the floodgates nor letting the fish out of the upper pool nor drawing down the water so low or in such manner as to kill or prejudice the fish.[1]

In 1775 this unusually detailed condition allowed the lessee (Thomas Johnson of Darnford, miller) a great deal of control over the water that powered the mill (a corn mill in Darnford), on the provision that the miller's activities did not harm the fish in the mill pool. Existing studies of flooding in Britain have used interviews,[2] epigraphic markers,[3] periodicals,[4] newspapers,[5] parish registers,[6] existing databases,[7] commissions of sewers,[8] various narrative sources,[9] and even poetry.[10] Diaries were also used by Harvey-Fishenden as part

[1] SRO D1851/8/53 (3).
[2] Lindsey McEwen et al., "Flood Histories, Flood Memories and Informal Flood Knowledge in the Development of Community Resilience to Future Flood Risk," *Hydrology for a Changing World*, 2012, 01–04.
[3] Bayliss and Reed, "The Use of Historical Data in Flood Frequency Estimation"; Macdonald, "Reassessing Flood Frequency for the River Trent through the Inclusion of Historical Flood Information since AD 1320"; Neil Macdonald, "On Epigraphic Records: A Valuable Resource in Reassessing Flood Risk and Long-Term Climate Variablility," *Environment History* 12, no. 1 (2007): 136–40.
[4] Bayliss and Reed, "The Use of Historical Data in Flood Frequency Estimation"; Macdonald, "Reassessing Flood Frequency for the River Trent through the Inclusion of Historical Flood Information since AD 1320"; Alison Williams and David Archer, "The Use of Historical Flood Information in the English Midlands to Improve Risk Assessment," *Hydrological Sciences-Journal-Des Sciences Hydrologiques* 47, no. 1 (2002): 57–76; Archer et al., "Historical Flash Floods in England: New Regional Chronologies and Database."
[5] Bayliss and Reed, "The Use of Historical Data in Flood Frequency Estimation"; Macdonald, "Reassessing Flood Frequency for the River Trent through the Inclusion of Historical Flood Information since AD 1320"; Williams and Archer, "The Use of Historical Flood Information in the English Midlands to Improve Risk Assessment"; Archer et al., "Historical Flash Floods in England: New Regional Chronologies and Database."
[6] Veale, Bowen, and Endfield, "'Instead of Fetching Flowers, the Youths Brought in Flakes of Snow': Exploring Extreme Weather History through English Parish Registers."
[7] Archer et al., "Historical Flash Floods in England: New Regional Chronologies and Database"; Macdonald, "Reassessing Flood Frequency for the River Trent through the Inclusion of Historical Flood Information since AD 1320."
[8] Morgan, "Understanding Flooding in Early Modern England."
[9] Morgan, "Flooding in Early Modern England: Cultures of Coping in Gloucestershire and Lincolnshire."

of the *Flooding and Drought* project.[11] However, they are rarer prior to 1750 and the Staffordshire Record Office catalogue lists no personal diaries (rather than parliamentary or legal) within the period studied here. Both diaries and correspondence are not rooted in a specific place but move with their author. They can be incredibly valuable for the minutiae of people's lives (including weather) but present problems for studies of a specific area. Instead of these, this chapter makes use of private administrative records from estate collections, augmented with other records where relevant.

Estate records (to use the term by which this class of archive is normally known to archivists) encompass a range of record types, including correspondence, maps and plans, accounts, deeds and any other possible record that played a role in the management of an estate. They form a substantial part of the holdings of most local record offices, having been collected from local landowners since the early days of such repositories. Personal records have traditionally been seen as very distinct from government records,[12] and have not until relatively recently received as much attention in archival literature.[13] However, Philippa White et al have created a framework for the arrangement of estate records,[14] and a recent issue of *Archives and Records* has highlighted their potential for many uses, including collaborations,[15] community projects,[16] for commercial opportunities[17] and

[10] Hywel M. Griffiths, Eurig Salisbury, and Stephen Tooth, "'May God Place a Bridge over the River Tywi': Interrogating Flood Perceptions and Memories in Welsh Medieval Poetry," *Cultural Histories, Memories and Extreme Weather: A Historical Geography Perspective*, 2017, 93–111.
[11] "Historic Flooding and Drought in Staffordshire – @FloodandDrought."
[12] Rob Fisher, "In Search of a Theory of Private Archives: The Foundational Writings of Jenkinson and Schellenberg Revisited," *Archivaria* 67 (2009): 1–24.
[13] Paul Dalgleish, "The Appraisal of Personal Records of Members of Parliament in Theory and Practice," *Archives and Manuscripts* 24, no. 1 (1996): 86–101.
[14] Philippa White et al., "The Arrangement of Estate Records," *Journal of the Society of Archivists* 13, no. 1 (1992): 1–8.
[15] Evans and Wyn Simpson, "Assessing the Impact of Collections-Based Collaboration across Archives and Academia: The Penrhyn Estate Archive."
[16] Annie Tindley, Micky Gibbard, and Alison Diamond, "Archived in the Landscape? Community, Family and Partnership: Promoting Heritage and Community Priorities through the Argyll Estate Papers," *Archives and Records* 40, no. 1 (2019): 5–20.
[17] Vicki Perry, "Filling the Family Coffers': Commercial Opportunities for Estate Archives," *Archives and Records* 40, no. 1 (2019): 21–36.

developing an online presence.[18] However, their value for environmental research has been little explored.

When planning the *Historic Flooding and Drought* project, the intention had been to focus on leases for mills. Although they have not usually been used in this way, deeds have the potential to be used to understand the relationship between landowners and their property, and leases can be used to examine the differing responsibilities of the tenant and landowner in maintaining the land. This focus remains, but while searching for leases, several other relevant records were identified, including title deeds, accounts, and legal settlements. Among private records there are often large numbers of deeds, which have been referred to as the "ugly ducklings" of the archive.[19] Nat Alcock has provided a guide for using deeds, and discussed how they might be used for the history of land, although this has focused on land mapping (for instance field names and boundaries).[20] While this is relevant for environmental research, it does not directly discuss it.

Tony Bonson makes extensive use of deeds to create a gazetteer of mills along the River Dane.[21] This work provides details of ownership of mills along with details of buildings and machinery. However, this is to understand the history of the of mills and he does not reflect on the environment around the mills beyond some limited description of the landscape in relation to the mill structure and machinery.[22] Enid Gouldie's research into Scottish mills uses leases and even examines ownership and management of water, although these findings do not necessarily translate to English mills.[23] The focus of this study is primarily on mills and milling, discussing various aspects of running a mill, including rents and repairs, technology, routines and ownership. Although this does also have relevance to the

[18] Anna-Maria Hajba, "'It's a Long Way to Tipperary': Using an Estate Collection to Develop an Online Presence," *Archives and Records* 40, no. 1 (2019): 55–72.
[19] Kevin T. Ward, "Pre-Registration Title Deeds. Part 2: Guidlines for Appraisal as Developed in the Bedofrdshire Record Office," *Journal of the Society of Archivists* 16, no. 2 (1995): 155; Nat Alcock, *Tracing History Through Title Deeds: A Guide for Family & Local Historians* (Barnsley: Pen & Sword Books Ltd., 2017), 1.
[20] Alcock, *Tracing History Through Title Deeds: A Guide for Family & Local Historians*.
[21] Tony Bonson, *Driven by the Dane: Nine Centuries of Waterpower in South Cheshire and North Staffordshire* (Congleton, Cheshire: The Midland Wind and Water Mills Group, 2003).
[22] Bonson.
[23] Enid Gouldie, *The Scottish Country Miller, 1700-1900: A History of Water-Powered Meal Milling in Scotland* (Edinburgh: John Donald Publishers Ltd., 1981).

environment, it is at heart a history of the technology and running of mills, and water is examined for the power it provided, rather than water itself.

A total of 206 records were examined by a volunteer as part of the *Historic Flooding and Drought* project and although only leases for mills between 1550 and 1750 were actively searched for, records outside this period were included in the study (Table 3.1). This number includes a draft lease[24] and one entry in Lord Stafford's estate records book, which gives the details of a lease.[25] The eventual sample ranged from 1550 to 1827, although the majority of the records came from the eighteenth century (Figure 3.1). Not all of the records were actually leases, some turned out to be part of a lease and release that had either been misidentified or had missing catalogue information. Some of these were accompanied by the release, but the majority were only identifiable by the nominal rent stated (usually one peppercorn). In total, 106 of these documents were leases for a mill (including three for a mill and a pool or a mill and a river, the lease being for the pool, rather than the pool being part of the inclusion clause), fifty-one were deeds selling mills, eight were leases for pools or waterlogged land, thirty-nine were leases for other property such as cottages or messuages (plots of land intended for a dwelling) near mills, and two were deeds selling property that happened to have a name including "mill." The leases were a far richer source than the deeds of title. Although both mentioned the water on the property in just over half of the examples examined, only leases contained clauses regarding maintenance as they transferred occupation of a property but not ownership.

Of the 206 leases and deeds consulted, seventy-four (thirty-six per cent) related to property that was part of the Paget family's estate, including thirty-nine of the 106 mill leases (thirty-seven per cent). The intention had been to focus on mills which had relatively complete series of documentation, in Cannock and Rugeley, Shugborough, Trentham and Burton-on-Trent. However, as these properties (except for Trentham) were all part of the Paget estate for some or all of the period, many of the leases involved repeated the same standard clauses with minor variance. As a result, the most interesting properties were often the ones with very little documentation, as the lease was more likely to reflect the individual property rather than using standard phrasing. Because of the extent of Paget-owned land,

[24] SRO D1734/1/4/92.
[25] SRO D1810/f.57d.

it is likely that when drawing up new deeds previous ones for the same or similar property were consulted by the family's lawyers, without there usually being much direct interest in the details from the Lords themselves. This does not mean these estates have been ignored. There are exceptions to the standard clauses, such as when a strip of land called the Seggs along the north bank of the mill pool at Shugborough was leased separately from the mill.[26] Other estate records also proved valuable: two plans of Shugborough survive from the eighteenth century survive showing the pool as a very different shape from the present day[27] and the joint annual accounts for clay, corn and malt mills in Burton-on-Trent 1703-1709 have been examined here.[28]

Table 3.1: Deeds examined

	Mills	Pools, streams, or waterlogged land	Other
Leases	106	8	39
Title deeds	51	-	2

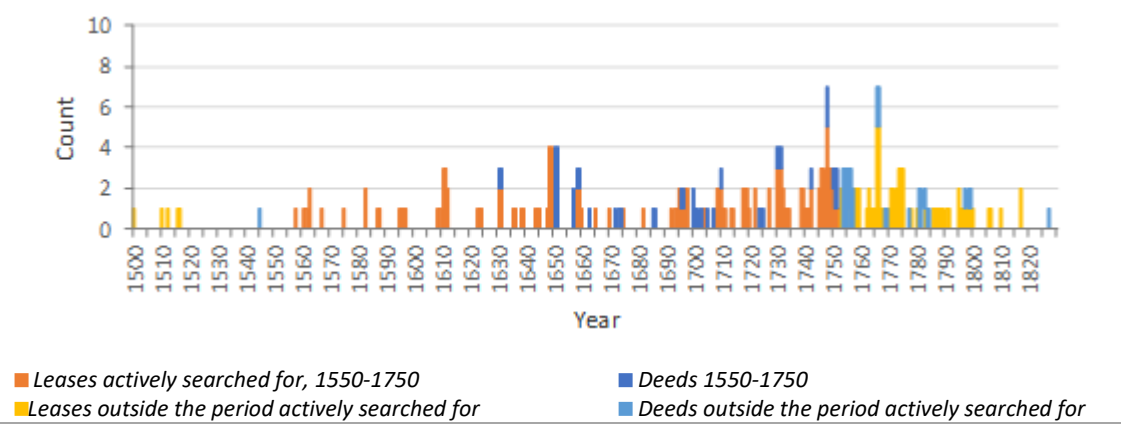


Figure 3.1: Dates of leases and title deeds examined
Records were only actively searched for between 1550 and 1750

3.1 The value of water

Because this chapter focuses on mills, the primary value of the water and watercourses involved is as power. The earliest use of water mills in England was during the Romano-British period, though their use seems to have ceased until the first Anglo-Saxon watermills

[26] SRO D615/D/10/3; SRO D603/E/4/62; SRO D603/E/4/26; SRO D615/D/10/4.
[27] SRO D603/H/1/2; SRO D615/D/10/1.
[28] SRO D603/F/3/1/19.

around 700AD.[29] Watermills for processing grain became widespread through the medieval period.[30] Adam Robert Lucas argues that there was an intense period of industrial milling activity (particularly in France) in the thirteenth to sixteenth centuries, though the only common "industrial" use of the waterwheel in England in this period was for fulling cloth.[31] In medieval England, most water mills used vertical wheels, either undershot or overshot.[32] An undershot wheel was powered by a fast-flowing watercourse passing through the vertical wheel at its bottom, carrying the blades with the flow of the water. An overshot wheel introduced the water at the top of a wheel with bucket-like blades, rotating the wheel through the force of the water's weight and mo. The latter was far more powerful, but the relative merits of the different configurations of water wheel were not given much attention until the eighteenth century, when increasing numbers of mills created greater competition for access to and efficient use of waterpower. In the late eleventh century, the Doomsday survey listed approximately 5,624 mills,[33] but by the eighteenth century there were at least 10,000 watermills in England, and probably more than 20,000.[34] There were sixty along a just a three mile stretch of the River Mersey.[35] Responding to increasing competition for adequate water power along rivers, engineers such as John Smeaton began to examine the efficiency of different types of mill and recognise the far greater power an overshot wheel provided.[36] John Smeaton advocated the use of another type of wheel – the breastshot wheel, which introduced the water halfway up the wheel.[37] Both overshot and breastshot wheels are more likely to require alterations to the watercourse in order to accommodate the wheel (which may have affected demands on the water supply).

This increasing competition for waterpower along rivers is evident in the leases examined in this study. As rivers became more populated by mills in the late seventeenth and

[29] English Heritage, "Introductions to Heritage Assets - Mills," 2011, 4, https://historicengland.org.uk/images-books/publications/iha-mills/heag212-mills/.
[30] English Heritage, 4.
[31] Adam Robert Lucas, "Industrial Milling in the Ancient and Medieval Worlds: A Survey of the Evidence for an Industrial Revolution in Medieval Europe," *Technology and Culture* 46, no. 1 (2005): 25–26.
[32] Stephen Halliday, *Water: A Turbulent History* (Stroud: Sutton Publishing Limited, 2004), 103.
[33] Terry S. Reynolds, *Stronger than a Hundred Men: A History of the Vertical Water Wheel* (London: John Hopkins Press, Ltd, 1983), 123.
[34] Reynolds, 123; Stephen Halliday, *Water: A Turbulent History*, 103.
[35] Stephen Halliday, *Water: A Turbulent History*, 103.
[36] Stephen Halliday, 104.
[37] Stephen Halliday, 104–5.

eighteenth century, providing a reliable water supply became harder.[38] The concentration of the leases found in the record office towards the latter end of the period studied likely reflects the increasing number of mills just as much as the increased survival of records (Figure 3.1). Sometimes tension between mills is evident in leases in efforts to try to resolve or prevent any disagreements between mills. In 1693 the building housing a paper mill in Shugborough was leased in two halves, and the west end of the mill was being turned into a fulling mill. The paper mill was allowed "all mill dams stangs ponds banks streams water watercourses ways paths etc. except that John Moorcroft shall have for the water and watercourses out of the said fleam or ponds for the use of the other end of the mill."[39] It must have been complicated to run two mills from the same building, though existing plans for mills with multiple wheels provide some insight into how they may have worked, with the wheels staggered to use different sections of the channel (Figure 3.2). Additionally, agreement would need to be reached regarding responsibility for maintaining the pool, sluices, and the flow of water.

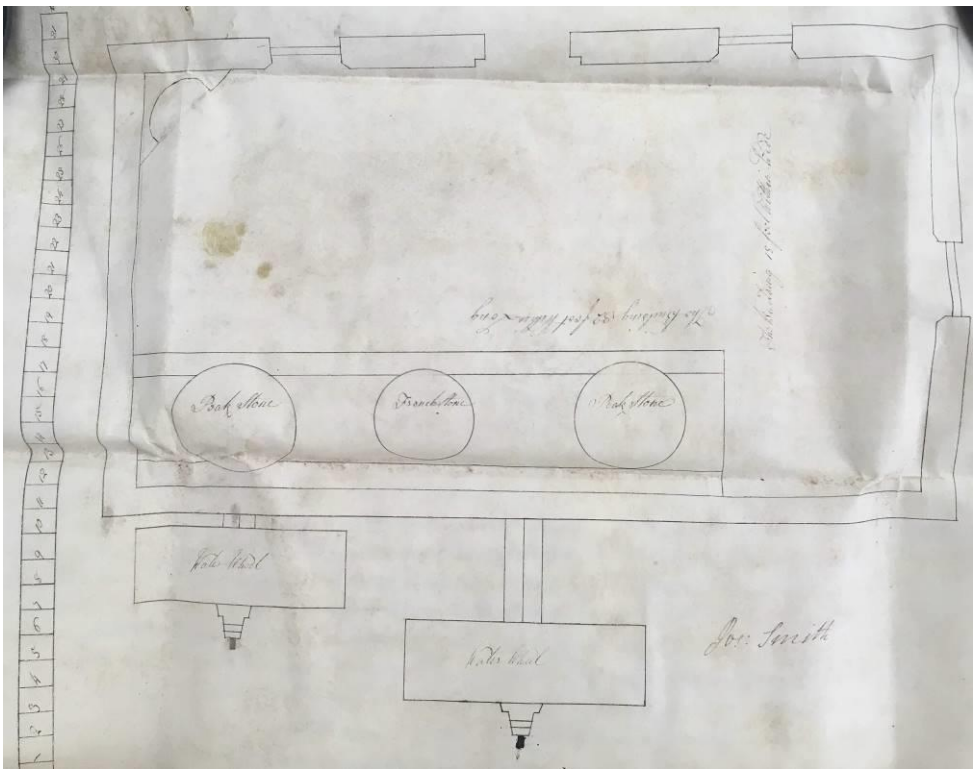


Figure 3.2: Plan of proposed mill in Lichfield in 1753 showing two water wheels.[40]

[38] Stephen Halliday, 103.
[39] SRO D615/D/19.
[40] SRO LD77/9/63 (2)

The problem was just as great if two mills were not in the same building, but were along the same watercourse, as the choices by the mill upstream (when to hold back the water and let it flow) would affect the mill downstream. In 1726 a fulling mill, house and fish gates mill in Burton-on-Trent was let with the proposition that a slitting mill would be built, "in which case nothing shall be done by drawing water that shall impede the corn mills called Burton mills or the grinding or working of them."[41]

Water can also be of value indirectly for the resources that water and watery land can produce. As has been discussed, the Seggs was possibly leased for the use of sedge on a piece of land "covered with water"[42] along the bank of a mill pool. The lease of Joane Mill in 1741 excludes "all grass rushes and herbage,"[43] which is reserved for the Earl. This is comparable to a fifteenth century example found by Galloway and Potts, when the Bishop of London received forty shillings annually for fishing and fowling on marshland in Stepney, along with a half share of the reeds cut there.[44] Rushes were not the only plants of value, and the 1744 lease of Pound Mill explicitly includes "the hosier bed adjoining the mill pool,"[45] referring to osiers or willows that were presumably on the bank of the mill pool, and valuable enough to warrant a specific mention in the lease. In other instances, trees were reserved for the landowner: for Palford Mill in Pattingham in 1717,[46] in Trentham in 1766,[47] and the slitting mill in Rugeley in 1775.[48] This reflects social tensions about property and rights as farmers and landowners increasingly restricted the practice of gleaning.[49] Gleaning was an important part of the rural economy, particularly for the poor, and (after food) firewood was one of the most important resources. [50]

However, the waters attached to a mill contained a greater resource than the flora. The most frequent exception to the tenant's right to the water and to maintain the water on

[41] SRO D603/E/1/184.
[42] SRO D615/D/10/1.
[43] SRO D742/A/21.
[44] James A. Galloway and Jonathan S. Potts, "Marine Flooding in the Thames Estuary and Tidal River c. 1250 – 1450 : Impact and Response," *Society* 39, no. 3 (2007): 6.
[45] SRO D(W)1738/C/5/6.
[46] SRO D564/3/4/9.
[47] SRO D593/B/1/23/41.
[48] SRO D603/E/3/298-299.
[49] Sharpe, *Crime in Early Modern England 1550-1750*, 177.
[50] Sharpe, 177.

the property was fishing. Of the 118 leases for mills, pools or watercourses examined, seventy-six do not mention fishing at all, however fourteen specifically include the right to fish, and twenty-six forbid it (in favour of the landowner being granted access to the land for fishing). Some change over time is discernible. None of the leases forbid fishing before 1622, though a draft lease for the fulling mill in Burton-on-Trent initially reserves fishing for the landowner, but an amendment seems to allow fishing in the weirs and floodgates.[51] Most leases prior to 1622 do not mention fishing at all, though a small number allow it. The weighting of the sample towards the eighteenth century, and the low number of leases found for some periods obscures the data slightly, however it seems that it became more common to forbid fishing in the eighteenth century than it was in the seventeenth century.

Landowners prohibiting fishing on their property included members of the Paget family,[52] Richard Swynfen (gentleman),[53] the bailiffs of Lichfield,[54] John Hickin,[55] William Legge (Earl of Dartmouth),[56] Theophilus Biddulph (Baronet),[57] Walter Chetwynd (politician),[58] members of the Leveson-Gower family,[59] and John Birch (mason).[60] In most of these cases, the leases are explicit in retaining the right to fish for the landlord, for example in 1622 "Lord Paget retains the rights of fishing in the pools of the mill and to draw down water at times convenient to maintain the fishing,"[61] likewise in 1630 Richard Swynfen also reserved for himself some control of the water and "the liberty for the drawing of the floodgates for his better fishing."[62] In 1681 this restriction and the potential disruption to management of the mill was slightly mitigated by William Paget stipulating a week's notice before he accessed the property for fishing.[63] Sometimes this came with specific maintenance requirements of

[51] SRO D1734/1/4/105a and b.
[52] SRO D603/E/4/8; SRO D603/E/1/104; SRO D603/E/4/25; SRO D603/E/1/184; SRO D603/E/1/826-827; SRO D603/E/3/216; SRO D603/E/3/213; SRO D603/E/3/298-299; SRO D603/E/3/310-311.
[53] SRO D(W)1738/C/6/3.
[54] SRO D77/9/60; SRO D77/9/63 (1).
[55] SRO D1798/647/2.
[56] SRO D742/A/21.
[57] SRO D(W)1738/C/5/6.
[58] SRO D615/E/6/1.
[59] SRO D3272/1/20/2/7; SRO D4092/C/2/22; SRO D593/B/1/23/41 (a); SRO D593/B/1/10/22; SRO D4092/C/2/23.
[60] SRO D77/9/63 (2).
[61] SRO D603/E/4/8.
[62] SRO D(W)1738/C/6/3.
[63] SRO D603/E/4/25.

the tenant in order to protect the fish from harm by the activities of the mill. In 1623 William Paget required that the "Lessee shall not at any time do any hurt or harm to the nets and engines of the fishery of Lord Pagett standing in the waters of the mills,"[64] and in 1741 William Legge allowed his tenants:

> And also liberty to stop dam and convert all springs and waters springing in the manor of Sandwell and liberty to scour ditches and gutters being at all times needfull and to draw any of the pools within the manor of Sandwell for the maintenance of the ironworks if needfull not spoiling or hurting any fish in the said pools[65]

This would have placed some limits on the use of the water, as draining a mill pond too much could have posed a risk to the fishing, which may have proved particularly problematic during periods of dry weather if maintaining water levels became difficult.

Sharpe identifies a redefinition of property rights occurring in the sixteenth to eighteenth centuries, and increased tension in the eighteenth century over the taking of "perks" in many trades.[66] It seems possible that fish may have been seen as a perk by many millers, contributing to landowners sometimes feeling a need to explicitly exclude fish from a lease. This also serves as an explanation for instances when landowners partially forbade fishing or allowed the tenant a portion of fish caught. In 1734 John Hickin forbade fishing but allowed his tenant one half of all eels caught in the pools or floodgates.[67] Likewise in the aforementioned lease of 1755 George Anson left "eels taken at the floodgates" as an exception to the prohibition on fishing.[68] These would have softened the clause forbidding fishing by allowing the tenant some compensation for the loss of a normal perk of their tenancy.

[64] SRO D603/E/1/104.
[65] SRO D742/A/21.
[66] Sharpe, *Crime in Early Modern England 1550-1750*, 178.
[67] SRO D1798/647/2.
[68] SRO D615/E/2/1.

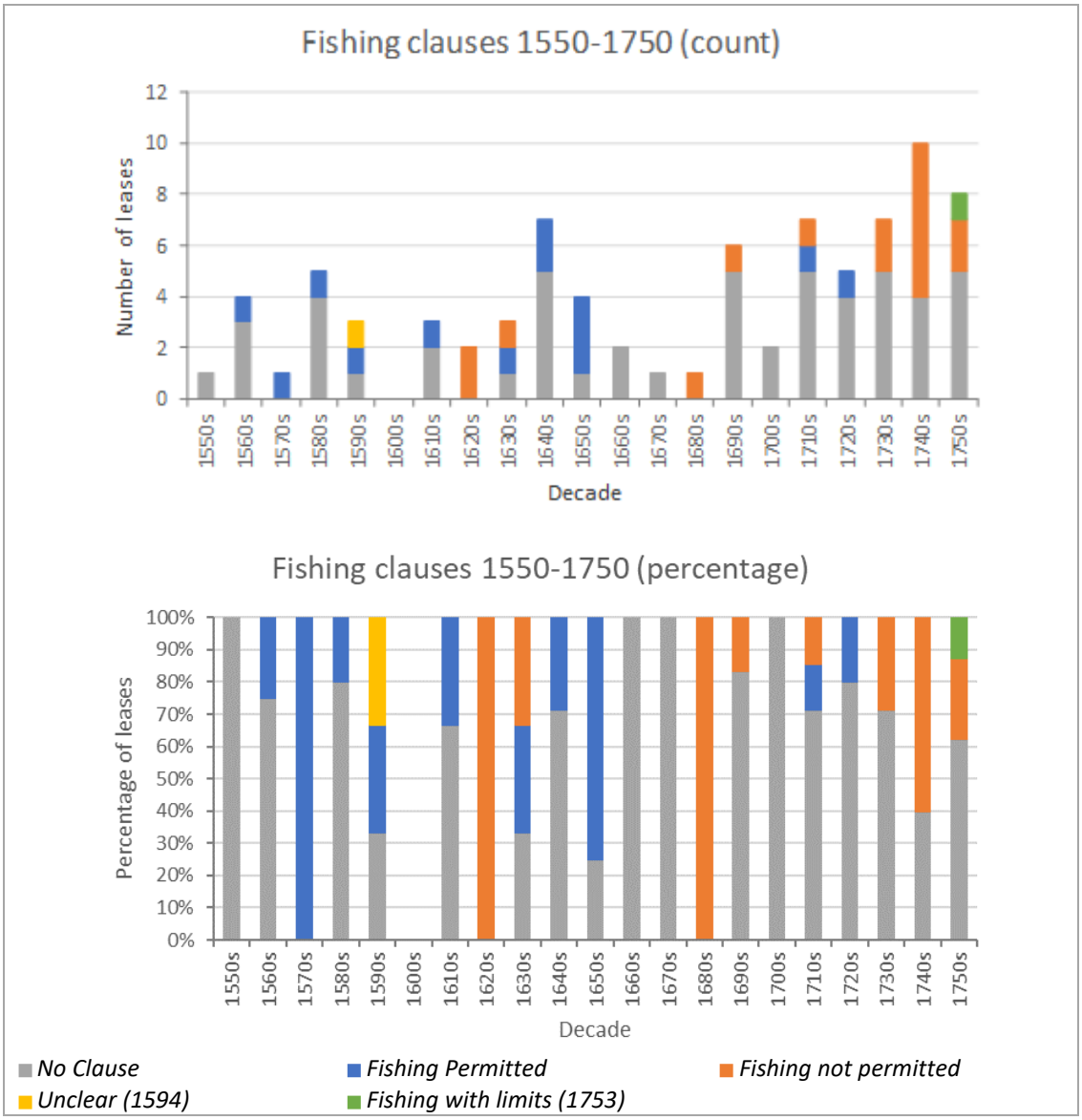


Figure 3.3: Fishing clauses from leases by decade

3.2 Leases

Mills were usually let to the tenant for long periods, often the duration of their life, resulting in long-term responsibility of the tenant for the mill and its water. The volunteer examining the leases identified the terms (length of) 125 leases. The most frequent terms were twenty-one years or ninety-nine years/three lives (Table 3.2). A reliable comparison between mills and other property cannot be made because the volunteer was not asked to record the terms for many properties other than mills and the sample of other properties was included incidentally because of the search process. However, the few other properties for which leases were consulted often also had long terms. It was the norm for mills to be

let long-term for a period of at least one life. This is useful for this study as it demonstrates that a miller would generally have occupied the property for long enough (assuming they or any successors remained for the length of the lease) that they would have experienced a significant portion of that mill's life, maybe even felt a sense of ownership of it.

Table 3.2: Terms of leases for mills, streams/pools/waterlogged land and other property

Term	Mill	Water	Other
100 years		1	
99 years/three lives	29	3	9
90 years	1		
70 years	1		
60 years	1		
44 years	1		
42 years	1		
40 years	1		1
31 years			1
30 years	1		
21 years	42		3

Term	Mill	Water	Other
20 years	3		
15 years	3		
13 years	3		1
12 years	1		
7 years	4		
5 years	1		
Lives of specified tenants	2		1
Remainder of previous lease	3		

3.2.1 Standard clauses in leases

There are two clauses in a lease that are most likely to mention water: the parcel (the clause that states the extent of the property being let) and any maintenance clauses. There may also be additional clauses regarding the landowner's rights to access the property for fishing, or any other specific concerns regarding the property. The majority of leases include a clause requiring the tenant to maintain the property, and although the exact clause varies a maintenance clause was a very common condition of a lease.[69] Within the standard clauses there are several phrases that appear repeatedly with only slight variations, such as "repair and keep repaired." As this frequently occurs within series of leases for the same property, it may be that these clauses are the result of the contents of new leases being based on prior ones for the same property or estate. This is even more likely for the seventy-four (thirty-six per cent) of the 206 records (leases and deeds) which turned out to all relate to property that was part of the Paget family's estate, including thirty-nine of the 106 mill leases (thirty-seven per cent).

[69] Alcock, *Old Title Deeds : A Guide for Local and Family Historians*, 61.

A similar standardised clause appears in two leases for a corn mill belonging to the crown in Shugborough 1587 and 1595.[70] The lease of 1587 states simply "lessee to keep the mill in repair,"[71] while the 1595 lease contains a more complex clause:

> the aforementioned mill and all houses and buildings and all fences, embankments, inclosures, shores, banks and sea walls all other necessary repairs of the premises in all and by all from time to time that becomes necessary and opportune to be undertaken at his own expense will well and sufficiently repair, bring up, sustain, scour, purge and maintain[72]

The phrase "muros marittimos" is a bizarre one to encounter describing somewhere as landlocked as Shugborough, as "marittimos" translates literally to "maritime" or "of the sea." It may refer to any bodies of water on the premises, and therefore "muros marittimos" could be a clumsy phrase referring to flood defences, not specifically sea walls, although it is a stretch to assume this is the case. Similar clauses for property in Staffordshire have been identified, such as one identified by Bagnall in the Augmentation Office Records, which has identical phrasing aside from the references to water, including "well and sufficiently repair, bring up, sustain, scour, purge and maintain."[73]

3.2.2 The parcel: water included in a tenancy

Sometimes there are exceptions to the tenant's rights specified in the parcel, often valuable resources such as timber[74] or potential minerals on the land.[75] As with title deeds, the

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[70] SRO D1798/HM Aston/30/2 and SRO D(W)1734/J/1614.
[71] SRO D1798/HM Aston/30/2.
[72] The lease has some water damage, so it not completely clear: "[…] predicto molendio et omnio domos et edificia ac omnio sepes inclausures littoral ripas et muros marittimos omnes alias necessarium reparaciones premissorum in omnibus et per omnia de tempore in tempus totiens quoeieus necesse et opportunum fuerit sumptibus suis propriis et expensis **bene et sufficienter reparabunt supportabunt sustinebunt escurabunt purgabunt et manutenebunt** durante termino predicto ac premissa sic sufficienter reparato et manutenta […]" (emphasis my own) SRO D(W)1734/J/1614.
[73] "[…] Et predictus Robertus Cawdwell executors et assignati sui omnia domos et edificial ac omnes alias necessarias reparaciones premissorum in omnibus et per omnia de tempore in tempus totiens quoeieus necesse et oportunum fuerit sumptibus suis propriis et expensis **bene et sufficienter reparabunt supportabunt sustinebunt escurabunt purgabunt et manutenebunt** durante termino predicto ac premissa sufficienter reparata et manutenta […]" (emphasis my own) J.N. Bagnall, *A History of Wednesbury, in the County of Stafford* (Wolverhampton: William Parke, 1854), 158.
[74] For example, a lease from 1717 for water corn mills in Pattingham, SRO D564/3/4/9.

parcel specifically included water on the property in just over fifty per cent of the records studied, the majority being from 1700 onwards rather than earlier in the period studied. Usually it is clear from the lease why water is included in the parcel, in 1768 two meadows "divided by a common watercourse into two parts" in Burton-on-Trent were rented along with "all hedges ditches ways watercourses paths passages etc."[76] This makes it clear that the tenant had rights to the watercourse itself and all water on the land, which would have been vital for the usefulness of the meadows. When a mill was leased, the frequency of water featuring in the parcel was high, occurring in eighty-three per cent of the documents examined, though there is no discernible pattern to when the leases without were from. Although often a specific watercourse or pool is referred to, the parcel is just as often all-encompassing in the water it describes, such as in a 1582 lease for "Hasyll Mylle" in Penkridge, which includes "And all waters brooks springs and streams discharging into the pool in Pillaton Hall, Penkridge and Teddesley Hay."[77] Phrases and terms such as "with all," "appurtenances," and "all other commodities" are common, seemingly giving the tenant free use of all water on the property.

This brief phrase granting the tenant rights to water sometimes was expanded to a longer list, such as, "together with all mill dams stangs ponds banks streams water watercourses ways paths etc."[78] The exact inclusions vary, and a variety of terms were found in the leases and title deeds (Table 3.3). Most of these terms are self-explanatory, however some have fallen out of use and therefore need to be defined. A fleam was a stream, sometimes an artificial channel or a mill stream or leat.[79] A stank was quite different, being a pool or slow-moving ditch, with the same Latin origins as "stagnate."[80] With some exceptions, such as references to fish or fishing (eels, shutts[81]), these terms can be broadly divided into three categories: words for flowing water (watercourses, ways, streams, ditches, cuts, brooks, springs, fleams, leats); ponds or relatively still water (ponds, pools, stanks, poundage); and human interventions to control or manage water (dams, floodgates, scouring and cleansing,

[75] Both trees and minerals are an exception to the lease of a water corn mill and drying kiln in Hill Chorlton in 1759, SRO D4092/C/2/22.
[76] SRO D603/E/1/326.
[77] SRO D603/E/5/1.
[78] SRO D615/D/19.
[79] "Oxford English Dictionary," accessed June 18, 2018, http://www.oed.com/.
[80] "Oxford English Dictionary."
[81] A two-year-old fish, usually a grayling: "Oxford English Dictionary."

cuts, weirs, poundage, floating, sluices, leats). However the presence of any of these terms may not guarantee the presence of water fitting these characteristics on the property, and few of these properties have sufficient surviving documentation for verification (although a properly functioning mill was likely to have a combination of all of them).

Table 3.3: Terms for bodies of water found in leases and title deeds

Flowing water	Still Water	Human interventions	Other
Watercourses *Ways* *Rivers* *Streams/streams of water* *Fleams (fleames, flemes)* *Throughs* *Springs* *Brooks (waterbrooks)* *Leats (lights)* *Passages for the water* *Ditches* *Cuts* *Drains* *Soughs*	*Stanks (stancks, stagnes, stangs, slangs,*[82] *stagnants)* *Pounds* *Pools* *Ponds* *Foreponds* *Lands covered with water* *Flaggy*	*Works under the water and works above* *Mill pools and mill ponds* *Walls* *Floodgates* *Dams* *Weirs* *Sluices* *Floating* *Hatches* *[Liberty of] scouring and cleansing* *Right of poundage/liberty to pound*	*Waters* *(Water) banks* *Fish and fishing* *Fisheries* *Shutts* *Eels* *Fishgates* *[H]osier beds* *[Water] wheels* *Wastes*

Although the parcel normally seemed to imply that all water was the right of the tenant, further terms of a lease sometimes created exceptions. Gouldie reports a common clause in eighteenth and nineteenth century mill leases in Scotland reserving the landowner's right to manage drainage on the property, "to change the course of water runs, to construct flow dykes on river sides and to make such leading drains as shall be judged proper." [83] Scotland's heavy rainfall is cited as the reason for this clause, however the effect was that mills suffered a decrease in water flow due to land drainage and a reduced drainage area.[84]

On rare occasions similar clauses appear in Staffordshire, in references that might appear to refer to water meadows. Meadows could be "drowned" by either "floating upwards," where damming a water course would flood the land upstream, or (less commonly) by introducing water at the top of a gradient and allowing it to flow downhill through a series of "catchworks" – banks and ditches which caught and distributed the water across the

[82] In this context, "slang" could mean either a strip of land or be an erroneous spelling of stank.
[83] Gouldie, *The Scottish Country Miller, 1700-1900: A History of Water-Powered Meal Milling in Scotland*, 105.
[84] Gouldie, 105.

field.[85] In the few instances when they may be mentioned in leases, they reserve the right of the landowner to "float" their lands as they see fit.

In 1681, a condition of the lease of Shugborough Mill allowed the owner, William Paget "the use of the waters and streams leading to the mill pool to be used at any time when needed for flooding floating and watering any of the lands belonging to him within Heywood Park and Shutburrowe."[86] However these clauses do not guarantee the presence of water meadows. There is no evidence of water meadows on the Shugborough estate from aerial photography (Figure 3.4). The landscape of Shugborough has changed substantially through works by several generations of the Ansons,[87] particularly after the devastating 1795 flood. This included Thomas Anson II commissioning the architect Samuel Wyatt to design the Park Farm in c.1805 near the site of the former mill.[88] Because of this, there is no guarantee that there would be much visible evidence surviving, however the area of the former pool is still evident around the Tower of the Winds as a depressed area prone to flooding, as the efforts of the Ansons did not completely obscure the existing landscape (Figure 3.5). The 1780s plans of the estate also do not show water meadows (Figure 3.8 and Figure 3.9; 3.3 Maps and Plans). There is certainly no mention of "floating" two decades prior in a 1659 lease for the mill in Shugborough, which:

> reserved to Lord Paget the liberty at any time to make any pool upon the brook called Sherbrook upon any of the lands of Lord Paget to turn the water of the brook over his lands in Heywood Park for the improvement of the grounds of the Park[89]

Given the extent of the later landscaping works to the estate, these clauses were probably included to protect the interests of the landowner and allow this work to take place.

Similarly, in 1795 an old paper mill in Tyrley was let on the condition that the owner, Thomas Dicken reserved "the right to take and use water out of the pound for the purpose

[85] Morgan, "Flooding in Early Modern England: Cultures of Coping in Gloucestershire and Lincolnshire," 53–54.
[86] SRO D603/E/4/25.
[87] The ownership and management of the estate in this period is attributed to the Ansons, but most of the deeds for Shugborough mills list the Pagets, the reasons for this are not clear. National Trust, "The Creators of Paradise," accessed February 6, 2020, https://www.nationaltrust.org.uk/shugborough-estate/lists/the-creators-of-paradise.
[88] National Trust.
[89] SRO D615/D/18/1.

of floating watering and improving his lands."[90] In addition to the potential use of the mill pool for floating water meadows, the attached plans for a new mill show land to be taken from Dicken's meadows to enlarge the mill pond.[91]It seems likely that the mill in Tyrley is the one shown in the 1890 Ordinance Survey Great Britain County Series map of Market Drayton as "Old Mill," which was near Tyrley Castle, and later became "Papermill cottage." This assumes the possibility that the course of Coal Brook has changed as the cottage is no longer on the same side of the brook as it is on the plan from 1795. It potentially followed the line of trees to the south of the mill where the "spring" is marked. However, there is no visible evidence of water meadows at Tyrley, and certainly no sign of catchworks, and the clause is likely another instance of a landowner reserving themselves rights to manage the land being leased.

[90] SRO D952/2/2/2/1.
[91] SRO D952/2/2/2/1.

Figure 3.4: Aerial view of Park Farm and site of former mill pool, Shugborough[92]

Figure 3.5: The Tower of the Winds photographed from the North-West across the site of the 17-18th century pool[93]

[92] High Resolution (25cm) Vertical Aerial Imagery [JPG geospatial data], Scale 1:500, Tiles: sj9821,sj9822,sj9921,sj9922, Updated: 29 October 2018, Getmapping, Using: EDINA Aerial Digimap Service, <https://digimap.edina.ac.uk>, Downloaded: 2020-02-06 15:46:36.222

Figure 3.6: Probable location of Tyrley Mill: late nineteenth century First Edition County Series Survey overlaid on present day aerial imagery[94]

[93] Photography my own, 19 Feb 2019.

[94] 1:2500 County Series 1st Edition [TIFF geospatial data], Scale 1:2500, Tiles: shro-01602-1,staf-02213-1, Updated: 30 November 2010, Historic, Using: EDINA Historic Digimap Service, <https://digimap.edina.ac.uk>, Downloaded: 2018-09-17 15:43:21.158
High Resolution (25cm) Vertical Aerial Imagery [JPG geospatial data], Scale 1:500, Tiles: sj6833,sj6834,sj6933,sj6934, Updated: 5 November 2017, Getmapping, Using: EDINA Aerial Digimap Service, <https://digimap.edina.ac.uk>, Downloaded: 2018-12-05 17:10:50.816

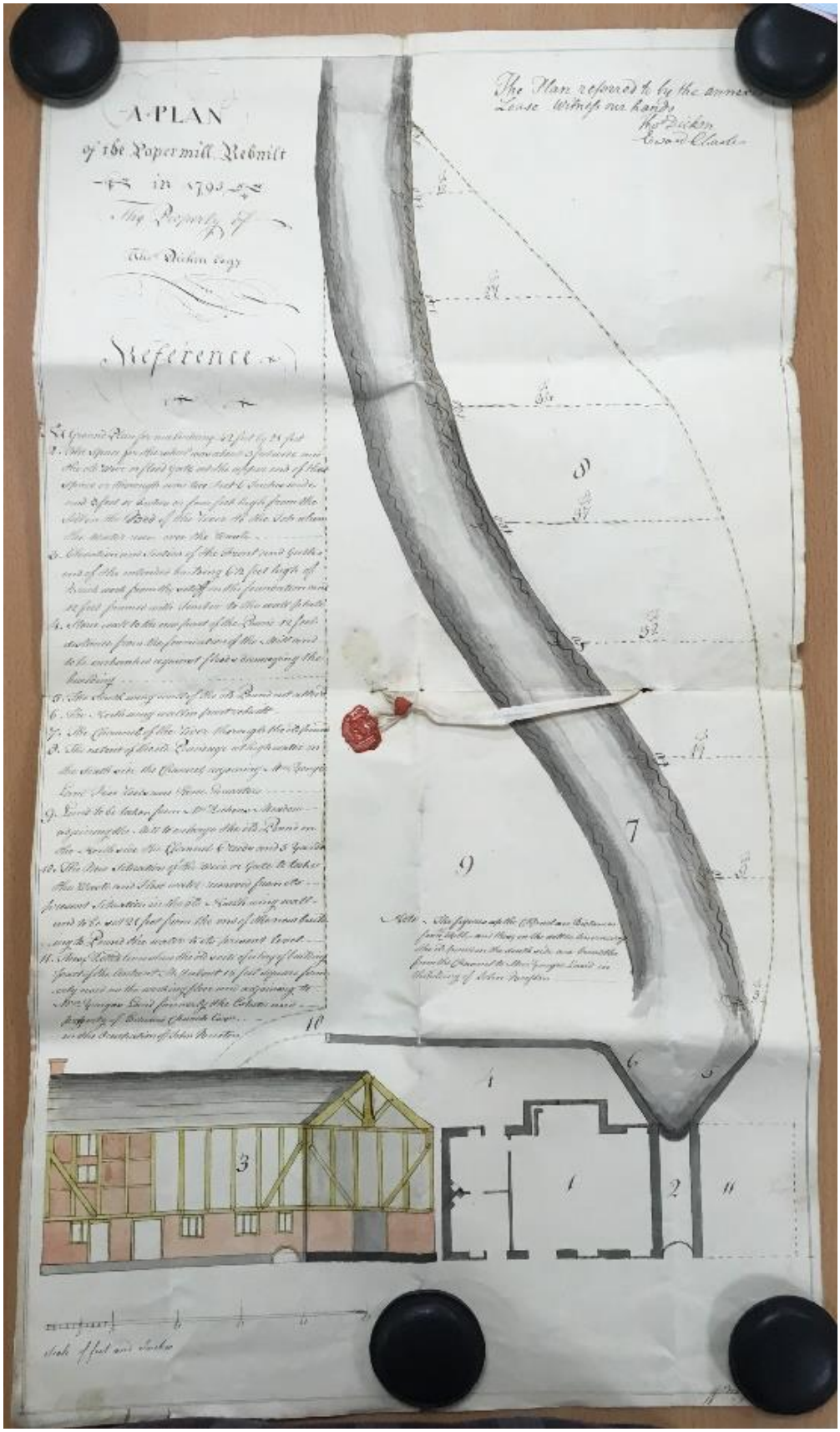


Figure 3.7: Plan of Tyrley Mill, 1795, D592/2/2/2

It was more usual for leases for mills or bodies of water to grant the lessee the right to manage the water themselves, or to make provision for potential difficulties. When leasing corn mills in Pattingham for twenty-one years in 1717, William Watson granted his tenant the right to "divert the waters that run to the mill for any purpose but leaving the waters in the usual channels at the end of the lease."[95] In West Bromwich in 1741 the River Tame was included in a lease for corn mills and a forge, along with the right to "stop dam and convert all springs and waters springing in the manor of Sandwell […] and to draw any of the pools within the manor of Sandwell for the maintenance of the ironworks."[96] Likewise, the slitting mill in Rugeley was given very specific provision in 1745 by Lord Henry Paget for times of water shortage, allowing the diversion of water from elsewhere:

> If for the better working of the mill it is thought necessary to bring by Soughs or Troughs a certain spring of water which now runs upon that part of Cannock Wood or Cannock Heath which lies above the forge the Earl allows the sum of £16 to be paid out in purchase part of the oak timber to make the Sough or Troughs through which the water is to be carried to the forge.[97]

These examples do not provide the tenant with unrestricted power to manage the water. However, they do demonstrate that having some control over water management and provision for water shortage may have been an important consideration when leasing these properties. More often, leases are silent on the limitations of the lessee's right to the water, with only a clause similar to the familiar "together with all mill dams stangs ponds banks streams water watercourses ways paths etc."[98] Too many restrictions would likely have made a property unappealing to a prospective lessee as they may have impacted on the functioning of a mill, and therefore its productivity and profits. Access to water was also arguably an assumed part of the property; Getzler demonstrates that in the 1601 *Luttrel's Case*, (a dispute over the diverting of water away from two corn mills) the ruling by the Exchequer Chamber was based on characterising the water powering a mill as an integral part of seisin or possession of the mill.[99]

[95] SRO D564/3/4/9.
[96] SRO D742/A/21.
[97] SRO D603/E/3/216.
[98] SRO D615/D/19.
[99] Getzler, *A History of Water Rights at Common Law*, 122.

3.2.3 Maintenance clauses

Many leases contain similar maintenance clauses with little variation. This reflects their nature as a standard component of a lease. When this is a simple "repair and keep repaired," they appear to offer little to help understand the maintenance of the property. They seemingly place upon the tenant all responsibility for maintenance, as well as any problems that arise from managing the water. The landowners (and their lawyers) creating the terms of these leases were potentially extremely remote, with limited direct interest or knowledge of the property, as was almost certainly the case when mills in Shugborough were leased by the crown. While rights to water on the property is often included in the parcel in leases, specific maintenance of the water or structures such as floodgates are not mentioned very often in the conditions.

In a few instances, maintenance clauses make clear the tenants' responsibility for the water on the property. Two of the leases for a corn mill in Shugborough contain the phrase "above ground and under water." In 1622 Lord William Paget required that the lessee William George should "within 2 years to put the mill in good and sufficient repair above ground and under water and all floodgates watergates banks and other things belonging to the mill,"[100] and in 1657 Dorothy Chetwynd was also required "to keep the mill both above ground and under water and all floodgates watergates banks and dams in good repair."[101] Another exception are the leases from Trentham, which like the lease for Pounds Mill, all specifically mention watercourses, floodgates and even mill machinery (Table 3.4). Other instances mention scouring or cleansing to keep watercourses clear, for instance the streams and watercourses for Rugeley fulling mill in 1557 were to be "well scoured."[102] Scouring appears as a requirement (or occasionally a right) in eleven leases across the entire period studied, from 1557 to 1775.[103] However even when specific mention of

[100] SRO D603/E/4/8.
[101] SRO D603/E/4/19.
[102] SRO D603/E/3/1.
[103] SRO D240/A/2/2, SRO D603/E/5/1, SRO D(W)1734/J/1614, SRO D(W)1738/C/6/3, SRO D603/E/1/829, SRO D3272/1/20/2/6, SRO D742/A/21, SRO D615/E/6/1, SRO D77/9/63 (2), SRO D1851/8/53 (3).

maintaining water is not present, it is arguable that responsibility for water is implicit, given the frequency with which water appears in the parcel of the leases.[104]

Table 3.4: Leases for Trentham mills

Reference	Year	Mill	Owner	Clause
D3272/1/20/2/6	1697	New Inn Mills/water corn mill, Trentham	John Leveson-Gower	"Lessee to well and sufficiently repair the mills and all houses buildings weirs banks dams and floodgates and to repair scour mend and keep the walls hedges ditches inclosures watercourses waterwalls paths etc"
D3272/1/20/2/7	1748	New Inn Mills/water corn mill, Trentham	John Gower	"Lessee to repair the mill house and water corn mills and all mill wheels mill stones troughs bolting tubs floodgates weirs dams ponds fleames and watercourses."
D593/B/1/23/41 (including counterpart, plus copy D/3272/1/20/2/8)	1766	Water corn mill, Trentham	Granville Leveson, Earl Gower	"Lessee to maintain the water corn mills including the mill wheels mill stones troughs boulting tubs floodgates weirs dams mill ponds fleames and watercourses in good and sufficient repair"
D593/B/1/11/18	1797	Blurton mill, Trentham	Thomas Swinnerton	"Lessee to well and sufficiently uphold repair and keep the mill mill race mill wheels pans machinery watercourses sluices soughs tunnels floodgates dams weirs etc in good repair in every respect."

The purpose for which land was let is likely to have determined exactly what was needed to maintain it. The pool for Hasyll Mill and the River Tame for Joane Mill were both let to supply mills with water. Likewise, the pools on Cannock Heath are associated with a forge, so presumably had some of the same issues as the mills – supplying a constant and reliable flow of power. Indeed, the lease mentions "floodgates troughs dams poundheads sluices and banks," and "dams poundheads floodgates troughs hatches sluices and banks."[105] The stream in Leek ran from Stanley Mills and came with "free liberty to pound the water in a pool," and "liberty to repair the dam or wear whenever necessary,"[106] though there is no indication of the use of the pool. However in Walsall in 1741 the lease is very specific about the use of the watercourse, being "to pound the water, erect a floodgate and operate a water engine supplying William Persehouse's house and others with water."[107] This presumably was a pump to privately supply "William Persehouse of Reynolds Hall" with

[104] As previously mentioned, water is included in the parcel for over eighty-three per cent of leases for mills.
[105] SRO D603/E/3/213.
[106] SRO 7191/1/8a-b.
[107] SRO D260/M/E/425/1a.

water, and required the construction of floodgates and creation of a pool to provide a consistent supply of water.

The maintenance of French paper mills has been examined by Pierre Claude Reynard, who found that tenants were responsible for "light" repairs, but major structural work was the responsibility of the owner. In contrast, many of the mills in Staffordshire appear to have been entirely the responsibility of the tenant.[108] It is usual in the Staffordshire leases to require maintenance of static structures including buildings, hedges, ditches, fences, and watercourses. However movable items such as waterwheels, mill stones or cogs are usually not mentioned. Despite being scarcer and more specific than the other standard clauses discussed, these are still only variations on a standard maintenance clause, providing a slightly more comprehensive list of property the tenants were responsible for.

There were occasions in which a landowner saw fit to make provision for the materials that might be required to carry out repairs, and in the cases where this happened assistance from the landowner would have helped offset costs of repairs. On rare occasions the raw materials were provided by the landowner: in 1557 Lord Paget had agreed to supply wood for repairs of the fulling mill in Rugeley and three loads of firewood per year,[109] and in 1738 Edward Wilson agreed to provide "all manner of materials" for his tenant, Thomas Poole, to repair the grist mill in Cannock (though Poole had to supply the workmen).[110] In Burton-on-Trent stipulations in 1623 that "weirs of stone are to be repaired with stone and other weirs are to be repaired with the material they are built with"[111] probably reflect their importance, as the function of the weirs would impact upon the mills, fishing, and industry in the surrounding riparian environment, highlighted by the frequency with which the weirs are mentioned in leases from Burton-on-Trent.[112] These instances where materials are specified, and occasionally even provided by the landowner, may reflect a number of things, and it may be that there had been prior issues with maintenance in those specific cases, or that it was recognised that the maintenance or repairs needed were greater than

[108] Pierre Claude Reynard, "Unreliable Mills: Maintenance Practices in Early Modern Papermaking," *Technology and Culture* 40, no. 2 (1999): 237–62, https://doi.org/10.1353/tech.1999.0105.
[109] SRO D603/E/3/1.
[110] SRO D260/M/T/4/21.
[111] SRO D603/E/1/104.
[112] SRO D603/E/1/7, SRO D603/E/1/24, SRO D603/E/1/72, SRO D603/E/1/231, SRO D603/E/1/290.

could be expected of the lessee. However, maintenance costs were inevitable in running a mill, and do not usually appear to have been the responsibility of the landowner.

Table 3.5: Maintenance clauses for pools and watercourses

DocRefNo	Date	Property	Clause
D603/E/5/1	24 Oct 1582	Hasyll Mille and pool, Penkridge	"authority to clense and scoure the watercourses from time to time and to make and sett up the dams and banks as high and broad as is convenient"
D(W)1738/C/6/6	29 Sep 1648	A pool called Swinfen Pool, near Lichfield	"with free liberty of fishing scouring and cleansing of the same"
D742/A/21	4 Feb 1741	River Tame and former mill/forge, West Bromwich	"liberty to cleanse and scour the pools streams and fleames and also to dig and get sufficient clay turf earth and gravel from the waste ground to mend the dams watercourses stanks and banks. And also liberty to stop dam and convert all springs and waters springing in the manor of Sandwell and liberty to scour ditches and gutters being at all times needfull and to draw any of the pools within the manor of Sandwell for the maintenance of the ironworks if needfull not spoiling or hurting any fish in the said pools"
7191/1/8a-b	13 Mar 1787	A brook, stream or watercourse, Leek	"the liberty to repair the dam or wear whenever necessary"

In these instances, maintenance is presented as a right rather than a responsibility. It was usual for maintenance of water systems to be required of the tenant to keep the property in good condition or to avoid harm or difficulties for other property (such as other mills relying on the same water). However, these leases seemingly empower the tenant to make decisions for the maintenance of the water as they saw fit, probably because the use of water was essential to the mill, and not granting the tenant some freedom to manage the property according to their needs may have rendered the lease pointless. Whether in practical terms this had any effect on how the property was managed is impossible to tell.

On occasion, it was hinted that a mill might be in a poor state at the beginning of the tenancy and need specific work to bring the property to working order. Pounds Mill in Lichfield in 1744 appears to have needed some attention as the standard "good and tenantable repair" is expanded upon, including specifying responsibility for the mill floodgates:

> The Lessee shall, after the Lessor has put the mill into good and tenantable repair, keep the mill dam and floodgates in the same. The Lessor is to build one good water wheel and two new cog wheels and from time to time as required supply timber stone and other materials for the repair of the mill floodgates and premises.[113]

Pounds Mill is not the only example of a mill requiring work before it could function. In 1755 mills in Alrewas were leased for only five pounds per annum. Rents for mills are highly variable, and one factor in the rent was likely to be the expected yield of the mill (which may not always be an accurate prediction of the actual yield).[114] George Anson granted the terms of the lease to Humphrey Hadley (miller) and John Aldridge (yeoman) "in consideration of the great expense the lessee will have in repairing the mills,"[115] which according to the lease had been unoccupied for some years.

In Lichfield in 1753 a mill needed to be completely rebuilt, and the permission to demolish Stowe Mill and rebuild was granted by the bailiffs of Lichfield, with provision for the maintenance of the new mill provided in unusually high detail:

> Lessees to well truly sufficiently and substantially uphold maintain sustain repair clense and scoure the mills water wheels troughs penstocks hurst troughs shafts and cog wheels gearings trundles heads stoppers meal troughs spindles gudgeons sack tackle leapjack joghing screen pressing mill iron work brass work and other materials and utensils and also the floodgates bridges dams and watercourses belonging to the mills.[116]

Attached to the lease for the mill to be rebuilt are the estimated costs of the work needed, and a plan of the new mill showing two vertical water wheels, driving three pairs of mill stones. The demolition of the existing mill and building of a new one was estimated by the carpenter, one Thomas Storer, at fifty-nine pounds, fifteen shillings and six pence. In contrast the estimate for the mill machinery by the millwright Joseph Smith was two-hundred and four pounds, five shillings and six pence.[117] The mill machinery was a significantly greater expense than the building and therefore movable items not included in

[113] SRO D(W)1738/C/5/6.
[114] Gouldie, *The Scottish Country Miller, 1700-1900: A History of Water-Powered Meal Milling in Scotland*, 209–10.
[115] SRO D615/E/2/1.
[116] SRO LD77/9/63 (2).
[117] SRO LD77/9/63 (2).

leases would have presented a much greater maintenance concern than the property being let.

Although clauses that reveal specific maintenance issues are rare, it was probably quite normal for mills to need substantial maintenance when one tenancy ended and another began, particularly if a tenancy ended due to the tenant's death. Reynard's study of eighteenth-century French paper mills notes the disrepair of the equipment belonging to a paper mill on the death of the owner in 1772.[118] Much of this disrepair comes from the function of a mill as an industrial building in which equipment can be expected to suffer wear and tear. A water wheel lasted at most eight to ten years,[119] and the lifespan of a mill may have been around twenty-five years.[120] Given the typically long terms of leases for mills, this is unsurprising. If a mill was usually leased on the expectation that it would be occupied by the same tenant for a lifetime or more, one tenancy could represent a significant period of use and wear on the mill structure.

3.2.4 Pools and rivers

Watercourses and bodies of water usually appear in records in relation to other property or subjects, making them more challenging to find information on. For example, maps and plans for the period studied might feature pools, streams, or rivers, but the subject of the map is usually an area or human structure (such as counties, estates or mills), rather than the body of water. They also sometimes appear in unexpected source material, such as a note in Alrewas parish register mentioning Druid Mere at Aldridge near Walsall.[121] In leases, they are usually appurtenances to other property, rather than being the subject of the lease (Table 3.1). In most records examined they were not calendared. However, there were rare exceptions when a pool, watercourse or waterlogged land were leased as property independently of other property (Table 3.6). For example, in 1582 "Hasyll Mylle" (likely

[118] Reynard, "Unreliable Mills: Maintenance Practices in Early Modern Papermaking."
[119] Reynolds, *Stronger than a Hundred Men: A History of the Vertical Water Wheel*, 287.
[120] Reynard, "Unreliable Mills: Maintenance Practices in Early Modern Papermaking."
[121] SRO D783/1/1/1.

Hazel Mill) was leased "and one pool of water called Hasyll Mill pool"[122] and in 1741 the River Tame was let in West Bromwich along with a former corn mill called Joane Mill, which was by that point used as a forge.[123]

Table 3.6: Leases for pools, streams or waterlogged land

DocRefNo	Date	Property
D1798/HM Aston/30/3	1596	Lease of fishery, Shugborough
D(W)1738/C/6/6	29 Sep 1648	A pool called Swinfen Pool, near Lichfield
D603/E/4/26	30 Jul 1691	A piece of land called ' The Soggs' (Seggs), Shugborough
D615/D/10/3	1 Aug 1729	The Seggs
D603/E/4/62	21 Aug 1729	A parcel of ground called the Soggs (Seggs)
D260/M/E/425/1a	16 May 1741	A ditch, cut or watercourse, Walsall
D603/E/3/213	20 Jan 1745	Two pools on Cannock Heath called Furnace Pool and Brindley Pool
D615/D/10/4	22 Dec 1748	The Seggs
D615/D/10/1	20 Nov1771	The Seggs (now made into a pool)
7191/1/8a-b	13 Mar 1787	A brook, stream or watercourse, Leek

Four leases for the Seggs has been included in this list because of its nature, described in 1729 as "flaggy" (full of flags or reeds[124]). The likelihood is that the Seggs was an area of land used for its sedge, which had uses for thatching and flooring. The value of rushes and sedge should not be underestimated, and in 1741 the lease for the River Tame and Joane Mill "reserved to the Earl all grass rushes and herbage."[125] Further description of the Seggs is included in leases of the mill from the 1770s after it had fallen out of use as a fulling (fabric) mill[126] and the two were leased together rather than separately. In 1771 it is described as "the Seggs part of which is covered with water".[127]

3.3 Maps and Plans

The leases examined above provide insight into the relationships between land (and water), landowner and tenant. However valuable this is, it does not give a full picture. The current mill on the Shugborough estate was built in the early nineteenth century, and it and the mill pool have been moved from their position in the sixteenth to eighteenth centuries (Figure

[122] SRO D603/E/5/1.
[123] SRO D742/A/21.
[124] "Oxford English Dictionary."
[125] SRO D742/A/21.
[126] In 1740 the mill is leased as a "paper lately fulling mill" before apparently becoming completely unused later in the century (SRO D615/D/18/4).
[127] SRO D615/D/10/1.

3.8; Figure 3.9). For detail of these changes, the maps and plans found among estate records are invaluable. As Phillips observes in discussion of Staffordshire maps by the cartographer William Fowler, due to a need for estate maps, English cartography underwent something of a revolution between 1550 and 1700.[128] Unfortunately, relatively few survive for Staffordshire.[129] Phillips acknowledges how little evidence there is for the Staffordshire rural landscape, and for land use, but demonstrates that maps for Staffordshire, although scarce, can provide evidence of farm and field structure, so do still have value.

Despite the changes to the landscape, the Seggs can be accurately located as it appears in a circa 1780 map of lands leased to George Anson (Figure 3.8). This map sadly has a large rectangular hole which intersects the mill pool, however the "Old Mill" is clearly labelled on one side of the mill pool and the word "Seggs" is just visible with a dotted boundary leading towards the Tower of the Winds (marked by a small circle in the water). However another, similar, map survives, attached to the lease (and later conveyance) of several parcels of land, including the Seggs from 1771 (Figure 3.9). This time, details of the plan are clear, and it shows both the pool at the time the plan was made as well as a previous outline of the pool. The plan clearly shows that the Seggs was a stretch of land that had previously been part of the pool, explaining its sodden nature.

The survival of such plans is incredibly valuable for researching the landscape of estates, particularly from the eighteenth-century or earlier as the agricultural revolution led to many landowners seeking to improve their entire estate. Between 1775 and 1831 parkland in Staffordshire may have as much as doubled.[130] In Staffordshire, Capability Brown was particularly influential, consulting on at least ten estates across the county.[131] In Shugborough, Thomas Anson closely controlled the landscaping, resulting in much of the garden architecture being near the house and the removal of Shugborough village.[132] For pools such as the one at Shugborough, the survival of these plans attached to leases allows

[128] A. Phillips, "The Staffordshire Maps of William Fowler," *South Staffordshire Archaeological and Historical Society Transactions* XXI (1980): 15.
[129] Phillips, 15.
[130] Phillips and Phillips, *An Historical Atlas of Staffordshire*, 132.
[131] Phillips and Phillips, 132.
[132] Phillips and Phillips, 132.

a comparison between the present landscape (Figure 3.5) and evidence from prior to these works (Figure 3.8, Figure 3.9). Many of these leases have the typical "repair and keep repaired" maintenance clause or similar. However, the leases for Hasyll Mill, Swinfen Pool, the River Tame and a watercourse in Leek all give the tenant the "liberty" or "authority" to manage the pool (Table 3.5). This was usually cleansing and scouring, plus additional rights for maintenance of dams, banks, or other features, but in Leek liberty is given to repair the dam or weir *instead* of cleansing or scouring.

Figure 3.8: Map of lands in lease to George Anson nd. [c.1780].[133]

[133] SRO D603/H/1/2.

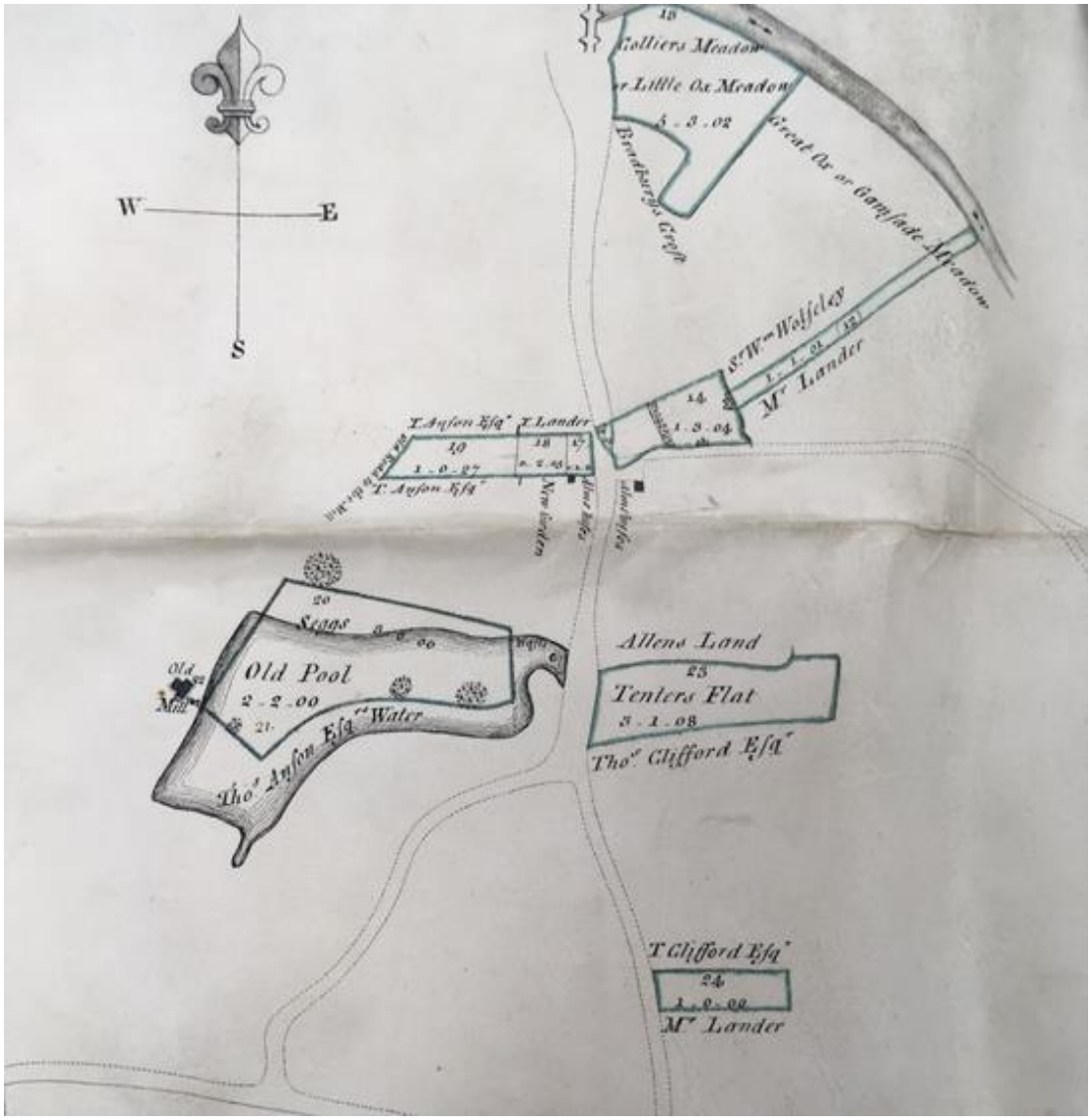


Figure 3.9: Plan attached to lease, and later conveyance, of The Pingle, Colliers Meadow, Barn Croft, The Seggs (now made into a pool), site of the old Shugborough Mills used as a fulling mill, Tenters Flatt, etc.[134]

3.4 Accounts

Another valuable source is financial accounts, which may include the cost of repair work. The Burton on Trent accounts for clay, corn and malt mills provide details of mill expenses and grain sales.[135] Reynaud describes maintenance as "not negligible" but nevertheless a

[134] SRO D615/D/10/1.
[135] SRO D603/F/3/1/19.

small portion of a paper mill's expenses.[136] Some hesitancy must be applied when comparing French paper mills to the corn and malt mills in Burton-on-Trent due to substantial differences in the processes and equipment involved. For example, paper mills relied on soaking rags in large vats to create a pulp, while grain mills needed to keep the grain and flour dry, and many corn mills had drying kilns to dry the grain before milling. The difference in humidity between the two environments is likely to have affected the lifespan of wooden equipment. The mill horses were the biggest expense for the mills, requiring food, medicine, shoeing, and tack, but repairs to the fabric of the mill do not appear very often. One difficulty in identifying maintenance expenses is that it is not always clear in the Burton-on-Trent accounts if expenses were for maintenance, for example "small nails" costing five pence in 1704 may have been used for a number of different tasks.[137] However there are accounts of wages that are labelled as being for "repairing the mill." In November 1704, eight men were hired for working for up to twelve days, then in December further work was billed for up to eleven days, including thatch (Table 3.7).

Table 3.7: Work billed for repairing Burton-on-Trent clay, corn and malt mills in November and December 1704

November:

Paid to	For	£	S	P
Henry James	Founder, for casting brass	0	10	10
Richard Bentley	12 days	0	10	0
William Wotton	12 days	0	9	0
Richard Bentley	12 days	0	10	0
Wm Wotton	6 days	0	6	0
William Wakeford	"for gettinge bindings" 2 days	0	1	4
	for filling in two sawpitts	0	0	8
Sam Wharton	12 days	0	9	0
John Symnott	12 days	0	9	0
	Total	**3**	**5**	**10**

December:

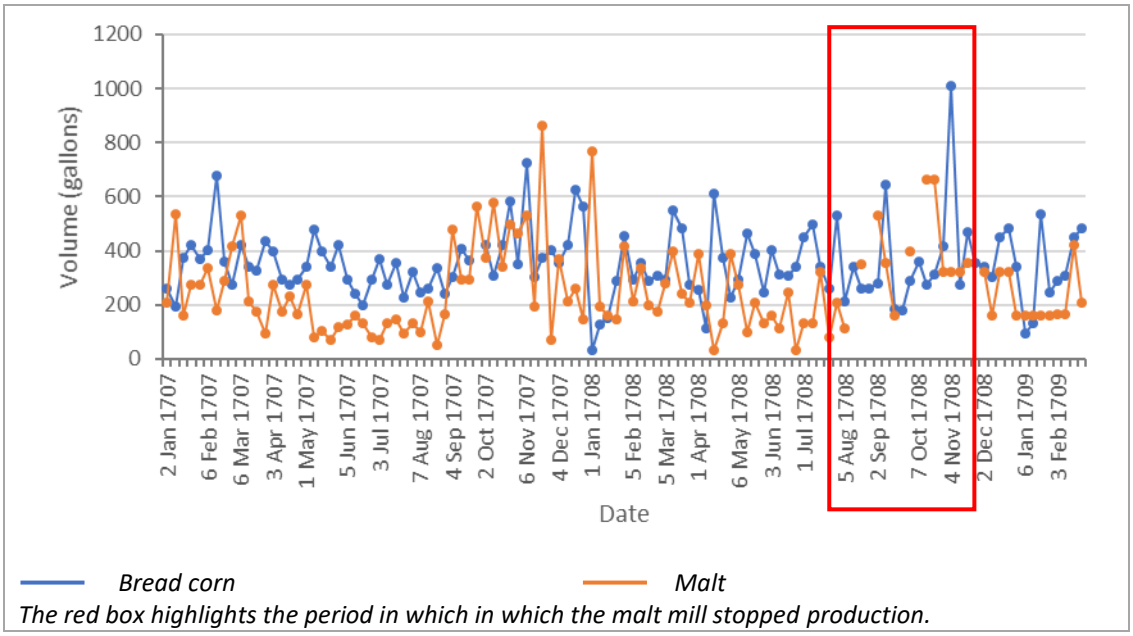
Paid to	For	£	S	P
	"for Nersinge a Rinde and Spindle"	0	3	5
Samuel Joss	For work at the mills	1	4	3
	20 thatch sheaves	0	1	2
Richard Bentley	4 days	0	3	2
Sam Wharton	11 days	0	7	5
John Symnott	11 days	0	7	6
Mr Wright	For a pine mould	0	3	0
John Symnott	8 days	0	5	4
Sam Joss	For work at the mills	1	15	3
	Total	**4**	**10**	**6**

[136] Reynard, "Unreliable Mills: Maintenance Practices in Early Modern Papermaking."
[137] SRO D603/F/3/1/19 (2).

The damage was enough to require nine different men working over the course of a month, and the purchase of twenty sheaves of thatch suggests extensive damage to the roof. It would be tempting to speculate about the reason for the need for these repairs in late Autumn was due to damage from storms. However, there is insufficient evidence to support stating this for certain as these accounts are mostly for wages, with little detail of the materials or work involved. This work incurred a total cost of seven pounds, sixteen shillings and four pence. Although this is no small sum, it is only six per cent of the total expenses for the mills for the financial year from March 1704 to March 1705 (one hundred and twenty-one pounds, one shilling and seven pence).[138]

Absences can be as revealing as the information that is presented. The price of the grain sold from the mills stays fairly constant (with occasional variance) through the period the accounts cover, however the volume of grain sold varies, with September to October usually representing the period during which the most was being milled (presumably related to harvests). However, between August and October 1708 there are several weeks during which the malt mill appears to have stopped working. This is around the same time as the flood recorded in Rugeley parish officer's accounts.[139] If the mill stopping during their highest season was due to the same rain that had devastated Rugeley, then the interruptions over several weeks suggest a longer period of heavy rain than the "great rain" in Rugeley implies.

[138] SRO D603/F/3/1/19 (2).
[139] SRO D3243/4/1.



The red box highlights the period in which in which the malt mill stopped production.

Figure 3.10: Grain sold per week from Burton-on-Trent clay, corn and malt mills, 1707-1709

3.5 Legal settlements

Among estate records there are sometimes extra-judicial settlements of disputes. They are worth examining when they can be found, as they often yield details about how land and water were managed, far more so than leases. Water was a natural force that could change the landscape, and these papers reveal how erosion could alter human boundaries and affect legal responsibilities and rights to land. Among the personal papers of Richard Leveson there is a memorandum of a temporary agreement from 1639 between Walter Brooke of Lapley, esquire, and Richard Fenihouse (a copyhold tenant) on the request of William Brodhurst.[140] The paper is damaged, with a hole which removes the beginning of four lines of the text. The issue appears to have been over a corn mill in Lapley. In the memorandum, Walter Brooke agrees to drop any proceedings against Richard Fenihouse, Meanwhile one of the parties (possibly Fenihouse) is required to repair the mill and mill dam, further details include grain milled at the mills and money to be paid to Brooke by Fenihouse. It seems that in this instance a miller did shirk their duty towards the maintenance of the property they inhabited, however the case was settled (with some mediation) outside the judiciary system.

[140] SRO D593/P/9/8.

In 1633 - 1634 there was a dispute regarding the water supplying Mere Mill in the Aqualate estate, and a bundle of surviving papers contains details of evidence given and the eventual awards of the dispute.[141] Enclosed with the papers from the 1630s is evidence given in an earlier dispute from 1593 with "for Skrymsher" (the defendant in the later case) written on the outside, indicating that the earlier case was being used as precedent for or to inform the 1630s dispute. In the 1593 case, after a failure by one Mr Canke to pay a rent of eels to one Mr Wright for the use of water in Holme Ditch leading from Aqualate Mere, Wright threatened to pull up the mouth of the ditch. Establishing the status quo was important to the legal process, and it became necessary to establish in detail the habitual flow of water to and from the Mere. This included including a yearly flow through the ditch, which was eight or nine feet wide and a supposed thirty-year precedent for the ditch being obstructed, although sadly half of the first page of the case is missing, along with many details of the incident. [142]

The ongoing disputes over Holme ditch span a period in which there was a gradual shift in water rights doctrine, which is visible (if subtle) in the arguments and language used in Aqualate. In the fifteenth and sixteenth centuries, a land owner had to be able to plead ancient use of the water when claiming a right to an unimpeded flow. Further, a mill had to claim "antiquum moledinuum," the presence of an ancient mill using the water.[143] In accordance with this, it became essential in 1593 for the plaintiff to establish a long precedent for the flow of water at Aqualate Mere, and that the stopping of the ditch had only been under the direction of the present owner and his father. Thus, the stopping of the ditch and the inconsistent lowering and raising of floodgates for the mill had damaged land and ancient fishing rights.[144] The words "ancient" and "anciently" appear multiple times throughout both the 1593 and 1630s cases along with, indicating how the case leant heavily on the principles of ancient use and *antiquum molendinuum*. Meanwhile the defendant stressed the profitability of the mill, including the benefits from the floodgates to fishing.

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[141] SRO D(W)1788/P49/B7.
The papers from the 1593 case consist of several sheets attached together. Half of the first page is missing, and the subsequent pages are numbered from 4 onwards.
[142] SRO D(W)1788/P49/B7.
[143] Getzler, *A History of Water Rights at Common Law*, 117.
[144] SROD(W)1788/P49/B7 (unfoliated first page, 4-5).

As already mentioned, in the early seventeenth century, the emphasis in water rights cases began to shift. While Getzler says prescriptive and natural rights are hard to separate in the sixteenth century, natural rights began to solidify.[145] In 1610 the maxim *sic utere tuo ut alienum non laedas* (so use your own property as not to harm that of another) was coined.[146] This principle is evident, though not explicitly stated, in the 1593 case as the plaintiff stressed how high water levels had "worne away to the quantity of an acre" the ground in Mere Meadow, and the potential that "the greatest parte thereof is like to be washed in like manner."[147] As noted, the changes in how water rights were litigated was not sudden, but a gradual, slight shift, even though *sic utere tuo ut alienum non laedas* was not explicitly stated prior to 1610, it expressed an existing need to balance differing needs without harm to either party.

In 1633 it was claimed that the "surges and waves" cause by one Mr Skrymsher operating a mill was damaging the meadow of a Mr Cotes. Skrymsher argued that limiting the depth of the mill pool would make maintaining the pool and mill "not worth the while for Mr Skrymsher."[148] The case therefore hung on damage to Cotes' meadow versus damage to the function of the mill if it were restricted (and the right of the mill to a sufficient supply of water), rather than on an "ancient" right. A note added to the case on 22nd February 1633/4 by John White states:

> I think that in case it be cleare that the meare hath gained any of Mr Cotes his meadow without fault or practice of Mr Skrimsher, Mr Cotes cannot fishe upon that w[i]ch is gained so nor putt any boate upon it or make any use of it, for it is his defaulte that he looks not to his bankes & boundes of his lande, & no man shall take advantage of his owne folly. And it is a natural thinge & usuall with meares to weare their bankes.[149]

In this instance, the responsibility to refrain from damage to another's property did not negate the responsibility to maintain one's own. The lack of culpability on the part of Skrymsher is not based wholly on whether his mill affected Cotes' land. It was instead based on the suggestion that Cotes could have taken measures to prevent his bank from

[145] Getzler, *A History of Water Rights at Common Law*, 117.
[146] Getzler, 122.
[147] SRO D(W)1788/P49/B7, 4.
[148] SRO D(W)1788/P49/B7.
[149] SRO D(W)1788/P49/B7.

wearing away, and the knowledge that damage from the waters of the Mere was "natural." At this stage, resolution of such disputes involved a degree of give-and-take, with flexible negligence standards.[150] In this instance, these standards were also deemed to include the responsibility to protect one's own property.

[150] Getzler, *A History of Water Rights at Common Law*, 124–27.

Figure 3.11: Aqualate Mere, late nineteenth century First Edition County Series Survey overlaid on present day aerial imagery[151]

Figure 3.12: Detail of Mere Eye Covert (mentioned in 1593)[152]

[151] 1:2500 County Series 1st Edition [TIFF geospatial data], Scale 1:2500, Tiles: staf-03516-1,staf-03613-1,staf-04204-1,staf-04301-1, 04305-1. Updated: 30 November 2010, Historic, Using: EDINA Historic Digimap Service, <https://digimap.edina.ac.uk>, Downloaded: 2018-11-07 14:58:57.819
High Resolution (25cm) Vertical Aerial Imagery [JPG geospatial data], Scale 1:500, Tiles: sj7519,sj7520,sj7521,sj7619,sj7620,sj7621,sj7719,sj7720,sj7721,sj7819,sj7820,sj7821,sj7919,sj7920,sj7921, Updated: 5 November 2017, Getmapping, Using: EDINA Aerial Digimap Service, <https://digimap.edina.ac.uk>, Downloaded: 2018-12-05 17:32:55.0

[152] As above.

Figure 3.13: Mere Eye Covert and corn mill, [153]

Issues with water ownership and disruption caused by mills were not unique to Aqualate. In 1689 the manor of Wychnor made a complaint against neighbouring Alrewas as the floodgates for the new mills in Alrewas were causing flooding and damage in Wychnor.[154] The record is dated 1689 and appears in a scrapbook compiled by the Reverend E. Vernon in the eighteenth century. Evidently a new mill in Alrewas (built by "A.B."), along with associated weirs and floodgates, had so dammed the river that it had flooded the lands of one Mr Offley in Wychnor and obstructing a causeway.[155] In dry times, the mill at Alrewas also held water back, preventing the functioning of Wychnor mills. Both the holding back and releasing of water by the new Alrewas mill alternately caused issues of both flooding and shortage for the existing mill in Wychnor.[156] A note added to the end advises on the case, saying that if the miller at Alrewas were found guilty the new mill may be demolished. The text explicitly refers to an "ancient mill" and the damage caused by the new mill, suggesting that variants on both *antiquuum molendinuum* and *sic utere tuo ut alienum non laedas* may have been used as arguments in the case. By this point pleading ancient use or an ancient mill was not always required or sufficient, and the theories of natural rights

[153] As above.
[154] SRO 100/1/pp131-133.
[155] SRO 100/1/pp131.
[156] SRO 100/1/pp132.

evident in cases resulted in the prevalence of the *sic utere tuo* principle,[157] although in Wychnor the older mill was clearly seen to have the greater right.

The emphasis in resolving these disputes was on protecting the ability of different mills, industries, and individuals to function. As far as possible, this was achieved without damaging one another's interests, but priority was generally given to whoever had the prior claim. This is consistent with the terms of the leases for properties: the burden for maintenance fell largely on the tenant except in exceptional circumstances, but with that came the freedom to operate the mill or use the property according to their purposes (the only frequent exception being fishing from the late seventeenth century onwards).

3.6 Conclusion: Refocusing records on the landscape

When leasing land that included water, the tenant was usually responsible for the upkeep and had a right to the water on the land. The requirement to "repair and keep repaired" came with the liberty to use the water on the land as the tenant needed. There are exceptions, sometimes providing help from the landowner or restricting access to specific resources. Over time, leases became more specific about what was or was not included, and it became more common for the landowner to reserve for themselves the right to fishing or alterations to the land.

A range of language is used to describe the water in leases, and earlier in this chapter some doubt was cast on whether the language of leases can be taken to be accurate, particularly given the example of a lease from the crown mentioning "muros marittimos." However, the landowners for many of the leases examined were not as remote as the crown. While land in many of the leases examined does not have any other documentation to verify whether the description is accurate, there are examples of large estates, such as held by the Ansons and Pagets, where there is extensive other material available. In the case of Shugborough, it is certainly possible to locate the Seggs, and the land still tends to be very wet, with sedge growing in the area. These two examples show that leases and records from administering property and estates can be revealing about the landscape, although caution needs to be

[157] Getzler, *A History of Water Rights at Common Law*, 124–27.

applied. The focus for research using estate records has often been on the landowner, but by refocusing on the property being managed, revealing details about the environment and the landscape can be found. When additional documentation is available, as with large estate collections, there may be further records that help provide more complete information.

4 : Using historical records to reconstruct patterns of flooding

Recent decades have witnessed a growth in the use of historical records for understanding past flood frequency, magnitude and impacts on societies. Whilst much work in the UK has focused on reconstructing flood series for flood analysis focused on past frequency,[1] trends[2] and patterns,[3] less attention has been given to the historical accounts themselves and periods in-between large flood events. Humans have long attempted to understand their environs and particularly the extreme events that have shaped them using geo-mythologies, [4] theodicy[5] and oral histories, [6] with many recalling past disasters that have befallen communities, societies and people.[7] There have also been attempts to collect information, by creating weather chronologies such as Thomas Short's in 1749[8] (which unfortunately rarely cites sources or corroborates events) or that by C. Brookes and J. Glasspoole in 1931.[9] However, the purpose for which a record is created shapes the narratives that the record might contain. The narratives of flooding discussed in this chapter will be very different from those presented by Morgan, despite examining flooding in England in the same period.[10] By focusing less on culture or social attitudes and more on

[1] Macdonald and Sangster, "High-Magnitude Flooding across Britain since AD 1750."
[2] Günter Blöschl et al., "Changing Climate Shifts Timing of European Floods," *Science* 357, no. 6351 (2017): 588–90.
[3] Günter Blöschl et al., "Current European Flood-Rich Period Exceptional Compared with Past 500 Years," *Nature* 583, no. 7817 (July 2020): 560–66.
[4] D Chandrasekharam, "Geo-Mythology of India," *The Geological Society of London* 273 (2007): 29–37.
[5] David K Chester, Angus M Duncan, and Hamdan Al Ghasiyah Dhanhani, "Volcanic Eruptions, Earthquakes, and Islam," *Disaster Prevention and Management* 22, no. 3 (June 2013): 278–92.
[6] Darren N. T. King, James Goff, and Apanui Skipper, "Māori Environmental Knowledge and Natural Hazards in Aotearoa-New Zealand," *Journal of the Royal Society of New Zealand* 37, no. 2 (2007): 59–73.
[7] Heather Sangster, Cerys Jones, and Neil Macdonald, "The Co-Evolution of Historical Source Materials in the Geophysical, Hydrological and Meteorological Sciences: Learning from the Past and Moving Forward," *Progress in Physical Geography* 42, no. 1 (2018): 61–82.
[8] Thomas Short, *A General Chronological History of the Air, Weather, Seasons, Meteors, &c. in Sundry Places and Different Times: More Particularly for the Space of 250 Years : Together with Some of Their Most Remarkable Effects on Animal (Especially Human) Bodies and Veg* (London: Printed for T. Longman, in Paternoster-Row ; and A. Millar, in the Strand, 1749).
[9] C. Brooks and J. Glasspoole, *British Floods and Droughts* (London: Ernst Berin Limited, 1928).
[10] Morgan, "Flooding in Early Modern England: Cultures of Coping in Gloucestershire and Lincolnshire"; Morgan, "Understanding Flooding in Early Modern England."

legal and administrative processes, a different account of flooding will be presented. The court records discussed in Chapter 2 and the responsibilities laid out in Chapter 3 frame flooding as a human event, if it is not caused by humans then it is the responsibility of humans to either prevent or repair damage caused by flood events.

Historical climatology as studied in Europe is defined by Brázdil et al as a field which aims to reconstruct temporal and spatial patterns of weather, climate and climate-related natural disasters, investigate the vulnerability of past societies and economies to climate, and to understand social representations of the climate.[11] The field originated in the late nineteenth century,[12] and in 1967 Emmanuel Le Roy Ladurie produced a pivotal monograph on climate over the last millennium, creating a more complete account than had previously existed.[13] In the early twentieth century, Brooks and C. Easton had developed simple indices as a means of using documentary source material as data,[14] which have since been developed by others.[15] In 1974 Gordon Manley published the first long temperature series in Europe spanning several centuries (1659-1973),[16] subsequently becoming known as the Central England Temperature Series, which is continually updated;[17] this was followed by the England and Wales Precipitation series in 1984,[18] which built on the materials published in *British Rainfall* in 1931,[19] and by J. M. Craddock in 1976.[20] In the 1980s, P. Alexandre

[11] Brázdil et al., "Historical Climatology In Europe – The State Of The Art."
[12] Louis Dufour, "Problème de La Variation Du Climat," *Bulletin de La Sociètè Vaudoise Des Sciences Naturelles* 63, no. 10 (1870): 359–556.
[13] Emmanuel Le Roy Ladurie, *Times of Feast, Times of Famine: A History of Climate since the Year 1000*, trans. Barbara Bray (London: George Allen & Unwin Ltd., 1972).
[14] C. E. P. Brooks, *Climate Through the Ages. A Study of the Climatic Factors and Their Variations* (London: Ernest Benn Limited, 1926); C. Easton, *Les Hivers Dans l'Europe Occidentale* (Leyde: E.J. Brill, 1928).
[15] H. H. Lamb, *Climate: Present, Past and Future : Volume 2: Climatic History and the Future* (London: Routledge, 1977); Pfister, *Klimageschichte Der Schweiz 1525-1860. Das Klima Der Schweiz von 1525-1860 Und Seine Bedeutung in Der Geschichte on Bevölkerung Und Landwirtschaft*.
[16] Gordon Manley, "Central England Temperatures: Monthly Means 1659 to 1973," *Quarterly Journal of the Royal Meteorological Society* 100 (1974): 389–405.
[17] Met Office, "Hadley Centre Observations Datasets," accessed October 8, 2020, https://www.metoffice.gov.uk/hadobs/hadcet/.
[18] Janice Lough, Wigley Tom, and Phil Jones, "Spatial Patterns of Precipitation in England and Wales and a Revised Homogeneous England and Wales Precipitation Series," *Journal of Climatology* 4 (1984): 1–25.
[19] F. J. Nicholas and J. Glasspoole, "General Monthly Rainfall over England and Wales 1727 to 1931," *British Rainfall*, 1931, 299–306.
[20] J. M. Craddock, "Annual Rainfall in England since 1725," *Quarterly Journal of the Royal Meteorological Society* 102 (1976): 823–40.

built on previous work to bring methods of critical analysis of historical source material to historical climatology,[21] although this work has since been critiqued.[22] Research into climate prior to human-induced change was fuelled by a rising awareness of global warming in the 1990s.[23] Since then, precipitation and temperature index series have been developed across Europe,[24] and further afield.[25] Another important development has been the use of proxy data, such as using tree ring data and wine harvest dates to create temperature series.[26] Such long records have identified an number of climatic phases in the last millennium, most notably the Late Maunder Minimum (1675-1715), the climax of a longer period often called the 'Little Ice Age', which has been studied by a large number of multidisciplinary and multinational research groups, resulting in it becoming a focus for analysis.[27]

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[21] P. Alexandre, *Le Climat En Europe Au Moyen Age. Contribution à l'historie Des Variations Climatiques de 1000 à 1425, d'après Les Sources Narratives de l'Europe Occidentale* (Paris: Ècole des Hautes Ètudes en Sciences Sociales, 1987).

[22] R. Brázdil and O. Kotyza, *History of Weather and Climate in the Czech Lands I (Period 1000-1500)* (Zürich: Zürcher Geographische Schriften 62, 1995).

[23] B. Frenzel, C. Pfister, and B. Gläser, eds., "European Climate Reconstructed from Documentary Data: Methods and Results" (Stuttgart, Jena, New York: Gustav Fischer Verlag, 1992); B. Frenzel, C. Pfister, and B. Gläser, eds., *Climatic Trends and Anomalies in Europe 1675- 1715. High Resolution Spatio-Temporal Reconstructions from Direct Meteorological Observations and Proxy Data. Methods and Results* (Stuttgart, Jena, New York: Gustav Fischer Verlag, 1994).

[24] R Brázdil, "Reconstructions of Past Climate from Historical Sources in the Czech Lands," in *Climatic Variations and Forcing Mechanisms of the Last 2000 Years*, ed. P. D. Jones, R. S. Bradley, and J. Jouzel (Berlin, Heidelberg, New York: Springer-Verlag, 1996), 409–431; Rüdiger Glaser, "On the Course of Temperature in Central Europe since the Year 1000 A.D.," *Historical Social Research* 22, no. 1 (1997): 59–87; Lajos Rácz, "Climate History of Hungary since 16th Century : Past, Present and Future," *Center for Regional Studies, Hungarian Academy of Sciences Discussion Papers* 28 (1999); A. F. V. van Engelen, J. Buisman, and F. IJnsen, "Reconstruction of the Low Countries Temperature Series AD 764–1998," in *Proceedings of the International Conference on Climate Change and Variability – Past, Present and Future*, ed. T. Mikami (Tokyo: Tokyo Metropolitan University, 2000), 151–157; A. F. V. van Engelen, J. Buisman, and F. IJnsen, "A Millennium of Weather, Winds and Water in the Low Countries," in *History and Climate: Memories of the Future?*, ed. P. D. Jones et al. (NewYork, Boston, Dordrecht, London, Moscow: Kluwer Academic/Plenum Publishers, 2001), 101–24.

[25] Lingyun Tang et al., "Reassessing Long-Term Drought Risk and Societal Impacts in Shenyang, Liaoning Province, North-East China (1200-2015)," *Climate of the Past* 16, no. 5 (October 20, 2020): 1917–35.

[26] Brázdil, Wheeler, and Pfister, "European Climate of the Past 500 Years Based on Documentary and Instrumental Data."

[27] Frenzel, Pfister, and Gläser, *Climatic Trends and Anomalies in Europe 1675- 1715. High Resolution Spatio-Temporal Reconstructions from Direct Meteorological Observations and Proxy Data. Methods and Results*; H. Wanner et al., "Synoptic Interpretation of Monthly Weather Maps for the Late Maunder Minimum (1675–1704)," in *Climatic Trends and Anomalies in Europe 1675–1715*, ed. B. Frenzel, C. Pfister, and B. Gläser (Stuttgart, Jena, New York: Gustav Fischer Verlag, 1994), 401– 424;

In comparison, historical hydrology has developed relatively recently. Although information about historic flood events has been collected since the end of the eighteenth century,[28] it has only been since the early 1990s that many scientific papers started critically examining documentary evidence for historical floods over the last millennium.[29] Several research projects have investigated the frequency of flood risk.[30] Historical hydrology generally makes use of descriptive material but can overlap with studies using of palaeoflood and instrumental data sources.[31] Examining descriptive material has the benefit of providing human perceptions of flood events and evidence of the impact of flood events on society.[32]

However, historical climatology and hydrology have both tended to examine extreme events. Extreme events are more likely to enter the written record, particularly prior to the presence of either gauged data or more frequent use of diaries, through local accounts in the form of newspapers, correspondence, loss accounts, parish registers or in the physical form of markers, notably epigraphic records.[33] Newspapers, used by many for studying events in the last two hundred years, seldom publish headlines announcing that the weather is completely normal; epigraphic markers have not often been left to mark a river

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H Wanner et al., "Theoretical and Applied Climatology Wintertime European Circulation Patterns During the Late Maunder Minimum Cooling Period (1675-1704)," *Theoretical and Applied Climatology*, vol. 51, 1995.

[28] C. G. Pötzsch, *Chronologische Geschichte Der Grossen Wasserfluthen Des Elbstroms* (Dresden: Walther, 1784); A. Pilgram, *Untersuchungen Über Das Wahrscheinliche Der Wetterkunde Durch Vieljährige Beobachtungen* (Wien: Joseph Edlen von Kurzbeck, 1788).

[29] C Rohr, "Der Fluss Als Ernährer Und Zerstörer. Zur Wahrnehmung, Deutung Und Bewältigung von Über- Schwemmungen an Den Flüssen Salzach Und Inn, 13.–16. Jahrhundert.," *Traverse—Z. Geschichte* 10, no. 3 (2003): 37–49; C Rohr, "Überschwemmungen an Der Traun Zwischen Alltag Und Katastrophe. Die Welser Traunbrücke Im Spiegel Der Bruckamtsrechnung Der 15. Und 16. Jahrhunderts.," in *33. Jahrbuch Des Musealvereines Wels (2001/2002/2003)* (Austria: Musealverein Wels, 2004), 281–327; E. Strömmer, *Klima-Geschichte. Methoden Der Rekonstruktion Und Historische Perspektive Ostösterreich 1700 Bis 1830* (Wien: Franz Deuticke, 2003).

[30] Heinz Wanner et al., "Dynamic and Socioeconomic Aspects of Historical Floods in Central Europe (Dynamische Und Sozioökonomische Aspekte von Historischen Flutereignissen in Zentraleuropa)," *Erdkunde* 58, no. 1 (2004): 1–16; V. R. Thorndycraft et al., "Palaeofloods, Historical Data & Climatic Variability: Applications in Flood Risk Assessment," in *Palaeofloods, Historical Data and Climatic Variability: Applications in Flood Risk Assessment*, ed. V. R. Thorndycraft et al. (Spain: Centro de Ciencias Medioambientale, 2003), 3–9; G. Benito and V. R. Thorndycraft, eds., *Systematic, Palaeoflood and Historical Data for the Improvement of Flood Risk Estimation. Methodological Guidelines* (Madrid: Centro de Ciencias Medioambientales, 2004).

[31] Rudolf Brázdil, Zbigniew W. Kundzewicz, and Gerardo Benito, "Historical Hydrology for Studying Flood Risk in Europe," *Hydrological Sciences Journal* 51, no. 5 (2006): 742.

[32] Brázdil, Kundzewicz, and Benito, 742.

[33] Macdonald, "On Epigraphic Records: A Valuable Resource in Reassessing Flood Risk and Long-Term Climate Variablility."

being slightly but not notably swollen; and parish registers tend to only note the most remarkable of events. These records are therefore often not ideal for more routine, mundane events. However, administrative processes that require regular recording can result in a record of the mundane, this includes the weather (including flooding) and its effects. Quarter Sessions on occasion record a lack of remarkable activity, as they needed to follow procedure, such as a presentment in January 1713 from Thomas Clarke, Constable for Alton [Alveton], that there was "nothing to present,"[34] (although this is hardly informative regarding the weather at the time). However, such periods of mundane activity are themselves interesting, but rarely examined.

Consideration of the mundane has benefits for understanding more about the relationships between communities and their environment and can help our understanding of the resilience of communities. Pfister urged the study of the mundane and "risikokultur" ("risk culture"), the ways in which risk can be built into society.[35] As Heather Sangster et al explain, "future historical analysis needs to understand how daily practices have shaped societal vulnerability, with actions both increasing and decreasing vulnerability and influencing adaptability."[36]

Flooding caused by extreme weather was not the only flooding of concern to communities. In sixteenth to eighteenth century Staffordshire, the Quarter Sessions rolls identify several cases of human negligence, which can be as great a concern as extreme events (if not greater than), as small instances of flooding could still be devastating for an individual or business. In the Michaelmas sessions of 1673, John Finch, a yeoman, was charged with working a forge on the River Stour at Amblecote, causing the water to flood the common highway between Stourbridge and Wolverhampton.[37] While minor, such an obstruction could easily cause disruption to travel, or even prove hazardous. However, these sources do not always explicitly link mundane maintenance and repairs to flooding.

[34] SRO Q/SR/483/5.
[35] Pfister, "Die 'Katastrophenlucke' Des 20. Jahrhunderts Und Der Verlust Traditionalen Risikobewusstseins."
[36] Sangster, Jones, and Macdonald, "The Co-Evolution of Historical Source Materials in the Geophysical, Hydrological and Meteorological Sciences: Learning from the Past and Moving Forward," 73.
[37] SRO Q/SR/361/7.

This chapter examines how routine responsibilities of administrative bodies can be used to examine flooding, building on the themes of mundanity identified by Sangster et al.[38] and of "risikokultur" by Pfister.[39] In doing so it moves away from focusing on extreme flood events, instead reframing and focusing on intervening periods. It thus considers the ways that every day (common) and small-scale actions can shape local community and societal vulnerability and resilience. In the context of the mundane, flooding is also being viewed as a human event as frequently as it is a natural event. Many of the events here are described as having human causes (whether directly or indirectly), and they are described in relation to their effects on human lives and structures. While this is a feature of the types of record used (as will be discussed), it may also reflect that many of these events had multiple causal factors: human action may have combined with natural factors (rain, thawing snow and ice), resulting in damage from a flood. The data used will be drawn from sources discussed in the previous two chapters and supplemented with data from existing datasets, mainly the *Chronology of British Hydrological Events*,[40] but also *TEMPEST*[41] and the *Gallery of Natural Phenomena*.[42] The two sets of resulting data (from the Record Office and from existing work) need to be handled separately. Every one of the events recorded from the Record Office occurred within Staffordshire, however few from existing datasets are recorded as occurring in Staffordshire. As the mundane is being examined, with many events being as small as a blocked ditch, it cannot be presumed that conditions in individual parishes in Staffordshire were the same as elsewhere along the River Trent and its tributaries.

[38] Sangster, Jones, and Macdonald, "The Co-Evolution of Historical Source Materials in the Geophysical, Hydrological and Meteorological Sciences: Learning from the Past and Moving Forward."
[39] Pfister, "Die 'Katastrophenlucke' Des 20. Jahrhunderts Und Der Verlust Traditionalen Risikobewusstseins."
[40] British Hydrological Society, "Chronology of British Hydrological Events"; Black and Law, "Development and Utilization of a National Web- Based Chronology of Hydrological Events."
[41] "TEMPEST Database - The University of Nottingham," accessed April 8, 2019, https://www.nottingham.ac.uk/research/groups/weather-extremes/research/tempest-database.aspx; Veale et al., "Dealing with the Deluge of Historical Weather Data: The Example of the TEMPEST Database."
[42] "The Gallery of Natural Phenomena," accessed October 8, 2020, http://www.phenomena.org.uk/.

4.1 Flood Indices

As the records used within this research are descriptive, they do not provide the height or discharge of floods, and often do not provide a precise date, though some descriptions focus on the level of flooding or the extent of damage caused. This makes assessing the severity of flooding challenging. However, indices offer an opportunity to compare events and rank them, with qualitative data converted into a numeric scale. Indices have been widely used in historical climatology,[43] a simple example being assigning -1, 0 and +1 to dry, normal, and wet months. They have been used in several contexts, including climate and weather[44] or flood severity.[45] Methods for producing indices vary, but the most relevant here are methods of counting and standardising phenomena,[46] such as levels of intensity based on the use of descriptions of flooding or flood damage.

Work is still needed on bridging between qualitive and quantitative data. In recognition of this a series of workshops were organised by the University of Liverpool in 2019 for the project *Building UK climate resilience through bridging the qualitative-quantitative data divide*.[47] One of the topics discussed was indices. Key themes included the difficulties in standardising indices, as the indices chosen (three-, five-, or seven-point) depend on the quality of the available data. Indices also risk losing the qualitative data that comes with

[43] David J. Nash et al., "Seasonal Rainfall Variability in Southeast Africa during the Nineteenth Century Reconstructed from Documentary Sources," *Climatic Change* 134, no. 4 (2016): 605–19; Brázdil et al., "Historical Climatology In Europe – The State Of The Art."
[44] Rudolf Brázdil, Hubert Valášek, and Jarmila Macková, "Climate in the Czech Lands during the 1780s in Light of the Daily Weather Records of Parson Karel Bernard Hein of Hodonice (Southwestern Moravia): Comparison of Documentary and Instrumental Data," *Climatic Change* 60, no. 3 (2003): 297–327; Pfister, Weingartner, and Luterbacher, "Hydrological Winter Droughts over the Last 450 Years in the Upper Rhine Basin: A Methodological Approach"; Brázdil et al., "European Climate of the Past 500 Years: New Challenges for Historical Climatology"; Lars Bärring and Hans von Storch, "Scandinavian Storminess since about 1800," *Geophysical Research Letters* 31, no. 20 (2004): 1–4, h; Neil MacDonald et al., "Historical Weather Accounts from Wales: An Assessment of Their Potential for Reconstructing Climate," *Weather* 65, no. 3 (2010): 72–81; Dario Camuffo et al., "500-Year Temperature Reconstruction in the Mediterranean Basin by Means of Documentary Data and Instrumental Observations," *Climatic Change* 101, no. 1 (2010): 169–99.
[45] J. Jacobeit et al., "Links between Flood Events in Central Europe since AD 1500 and Large-Scale Atmospheric Circulation Modes," *Geophysical Research Letters* 30, no. 4 (2003): 2–5.
[46] Rüdiger Glaser and Heiko Stangl, "Climate and Floods in Central Europe since AD 1000: Data, Methods, Results and Consequences," *Surveys in Geophysics* 25, no. 5–6 (2004): 485–510.
[47] The University of Liverpool, "Building UK Climate Resilience - Department of Geography and Planning - University of Liverpool," accessed March 24, 2020, https://www.liverpool.ac.uk/geography-and-planning/research/building-uk-climate-resilience/.

descriptive records and are only really needed if they bring something new.[48] Some of these issues are resolved here, as indices are being used as one of several approaches to analysing the source material, so qualitative data is not 'being lost.' The objective is not to contribute a dataset that can be synthesised with others, but to demonstrate potential approaches and uses for documentary material analysis, however the model chosen here shares commonalities with three-point models used for flooding by Brazdil, Rüdiger Glaser and others.[49] However, 0 has been added as a placeholder for events for which there is insufficient information to determine the severity (Table 4.1). The indicators chosen are well suited to understanding the mundane, but less effective for extreme events as there are no distinctions made for the severity of destructive flood events. With the material examined for this thesis, this is not an issue as only three of the events recorded from material at the Staffordshire Record Office were destructive enough to be given the most severe classification (Table 4.2).

[48] The University of Liverpool.

[49] R Glaser, H Stangl, and M Lang, "Floods in Central Europe since AD 1300 and Their Regional Context," *Houille Blanche-Revue Internationale De L Eau*, no. 5 (2004): 43–49; Rudolf Brázdil et al., "Flood Events of Selected European Rivers in the Sixteenth Century," *Climatic Change* 43 (1999): 239–85.

Table 4.1: Flood events classified as 0 (all drawn from the *Chronology of British Hydrological Events*)

Year	Month/Season	Description	Original source (as given)
1574	-	"Floods were recorded in 1254 and 1255, and in 1284 a flood badly damaged the bridge. (Footnote 9) Floods also occurred in 1380, 1402, (Footnote 10) 1574, (Footnote 11) 1771, at least three times in the 1790s, (Footnote 12) 1830, (Footnote 13) 1852, and 1875....."	'Burton-upon-Trent: Communications', A History of the County of Staffordshire: Volume 9: Burton-upon-Trent (2003), pp. 22-31
1614	Jan-Mar	"Many of the severest [Trent] floods have been caused by the break-up of a severe winter. The snow and ice thaw and at the same time there are falls of rain....This pattern has been repeated many times, examples occurring in 1614/15, 1683/84, February 1795 and March 1947." "	H.R. Potter (1958) Notes on the River Trent and its Tributaries, for Trent River Board Nottingham University Library pamphlet holding Em c36 POT
1677	May	Floods on the Idle	*History of Flooding in the Trent Valley up to 1930,* Trent River Board
1680	Aug	Floods on the Idle	- As above
1681	Dec	Floods on the Idle at Christmas	- As above
1686	May	The Idle Valley was again in flood in May	- As above
1689	Oct	The Idle Valley was in flood towards the end of October	- As above
1692	Spring	There were spring floods in 1692	- As above
1746	Feb	"The frost and snow continued till the 14th and then we had a flood." [R. Tame]	Reynolds, D. J. (1992) The weather in South Staffordshire 1739-1754 from the diary of Dr Richard Wilkes; Part 2, 1741-1747 Journal of Meteorology [UK] Vol 17 p326/7

Table 4.2: Flood events in Staffordshire classified as 3

Year	Date	Description	Source
1639	Jan 28th	A "great and suddaine" flood destroyed the mill in Wombourne	Wombourne Parish Register
1659	Michaelmas	Presentment for neglecting the river defences in the area of Busbeys Little Close, Uttoxeter. Flooding had Altered the course of the river.	Quarter Sessions
1708	Sep 15th	Flooding destroyed dams, floodgates, hedges and shops in Rugeley	Rugeley Parish Officer Accounts

Fatalities are often cited as evidence of the impact of extreme flood events.[50] However, in more mundane contexts they can be a poor indicator of severity and are not being used here to make judgements about flood events. The circumstances of individual deaths are

[50] Examples include: C. L. Johnson, S. M. Tunstall, and E. C. Penning-Rowsell, "Crises as Catalysts for Adaptation: Human Response to Major Floods," 2003; Zbigniew W. Kundzewicz et al., "Summer Floods in Central Europe - Climate Change Track?," *Natural Hazards* 36, no. 1–2 (2005): 165–89; Brázdil, Kundzewicz, and Benito, "Historical Hydrology for Studying Flood Risk in Europe"; Lindsey J. McEwen and Alan Werritty, "'The Muckle Spate of 1829': The Physical and Societal Impact of a Catastrophic Flood on the River Findhorn, Scottish Highlands," *Transactions of the Institute of British Geographers* 32, no. 1 (2007): 66–89; Greg Bankoff, "Comparing Vulnerabilities: Toward Charting an Historical Trajectory of Disasters," *Historical Social Research* 32, no. 3 (2007): 103–14; Macdonald and Sangster, "High-Magnitude Flooding across Britain since AD 1750."

not always clear, or not always directly related to the scale of flooding. For example, in December 1616 one William Turner slipped and drowned at Chotes Bridge, "the water being out."[51] There is no suggestion here that the water caused damage, and Turner was attempting to cross the bridge when he fell, suggesting it was intact and accessible. Likewise, during a "tempestuous snowy night" after weeks of flooding on the twenty-first December 1740 one George Lucas drowned crossing Wichnor Bridge late at night.[52] There are many potential scenarios for Turner and Lucas's December accidents, including icy conditions combined with human error in judgement, a damaged bridge or even potentially inebriation, which could have combined or occurred independently from flooding. After all, drownings in rivers are also frequently connected to events other than flooding. Almost half the accidental deaths found in Spence's study of London between 1650-1750 were attributed to drowning but were associated with transport and shipping on the Thames as well as mundane activities, such as fetching water and bathing in addition to other trauma, particularly injuries resulting in unconsciousness. As well, there were a number of non-accidental drownings, including both murder and suicide.[53] Duration of flooding is also not being considered here, unlike with Glaser et al's approach, as many of the records consulted did not provide dates or duration of the flood events.

Table 4.3: Flood indices, indicators, and examples used within this study

Level	Classification	Indicators	Examples
0	Unknown severity	Lack of information makes classification impossible	"Flooding in Derbyshire" (CBHE)
1	Water higher than usual	No known damage	"the water being out" (APR)
2	Minor damage or obstruction	Roads or paths obstructed, gravel washed onto land, minor repairs needed	Flooding of a highway at Coven Heath as a watercourse dividing the parishes of Bushbury and Brewood had been stopped up at Brewood Forge. In 1655 (QS)
3	Major damage	Destruction of structures such as buildings or bridges or evidence of extreme/widespread flooding	The Trent "was carried a quarter of a mile, and cast against trees, with the violence whereof the trees were torn up by the roots, and cast twelve score yards off." (CBHE) A "great and suddaine" flood destroyed Wombourne mill in 1639 (WPR)

[51] SRO D783/1/1/1.
[52] SRO D783/1/1/1.
[53] Craig Spence, *Accidents and Violent Death in Early Modern London: 1650-1750* (Woodbridge: The Boydell Press, 2016), 79.

Some judgements of severity have been made based on local topography, for instance by consulting aerial imagery of the areas mentioned. Wistow Church near Leicester is a good example; it was flooded in 1618 when, "About six in the morning the waters so increased that they prevailed to carry the bier about the church and ran over the communion table."[54] There is no mention of damage (aside from the bier) and the River Sence passes along the edge of the churchyard (Figure 4.1), so I ranked this as 2 even though the severity is unclear from the description alone. Other judgements needed to be made regarding statements such as “a great flood,” “serious floods” or benchmarking and statements of extreme such as "the like of which had not been known within the memory of people then living," or “the earth almost swims with water.” I have generally classified “Great” and “serious” as 2 unless other details indicate otherwise, while the more florid statements have each been assessed individually on their own merits. Fortunately for this study, the majority of the difficult or challenging to classify entries are from materials derived from CBHE, so are less significant here than the Staffordshire events. The only Staffordshire entry that caused any difficulties with classification was the presentment in 1659 for neglecting defences along the River Dove, which appears to be about the general state of the bank rather than a specific event that year.[55] However, as the effect on the course of the river was considered serious by the Quarter Sessions, it was ultimately decided to classify it as 3.

[54] CBHE 7778.
[55] SRO Q/SR/308.

Figure 4.1: St Wistan's Church, Wistow, nr Leicester, showing proximity of the river to the church[56]

[56] High Resolution (25cm) Vertical Aerial Imagery [JPG geospatial data], Scale 1:500, Tiles: sp6495,sp6496, Updated: 29 October 2018, Getmapping, Using: EDINA Aerial Digimap Service, <https://digimap.edina.ac.uk>, Downloaded: 2020-03-26 11:22:19.389

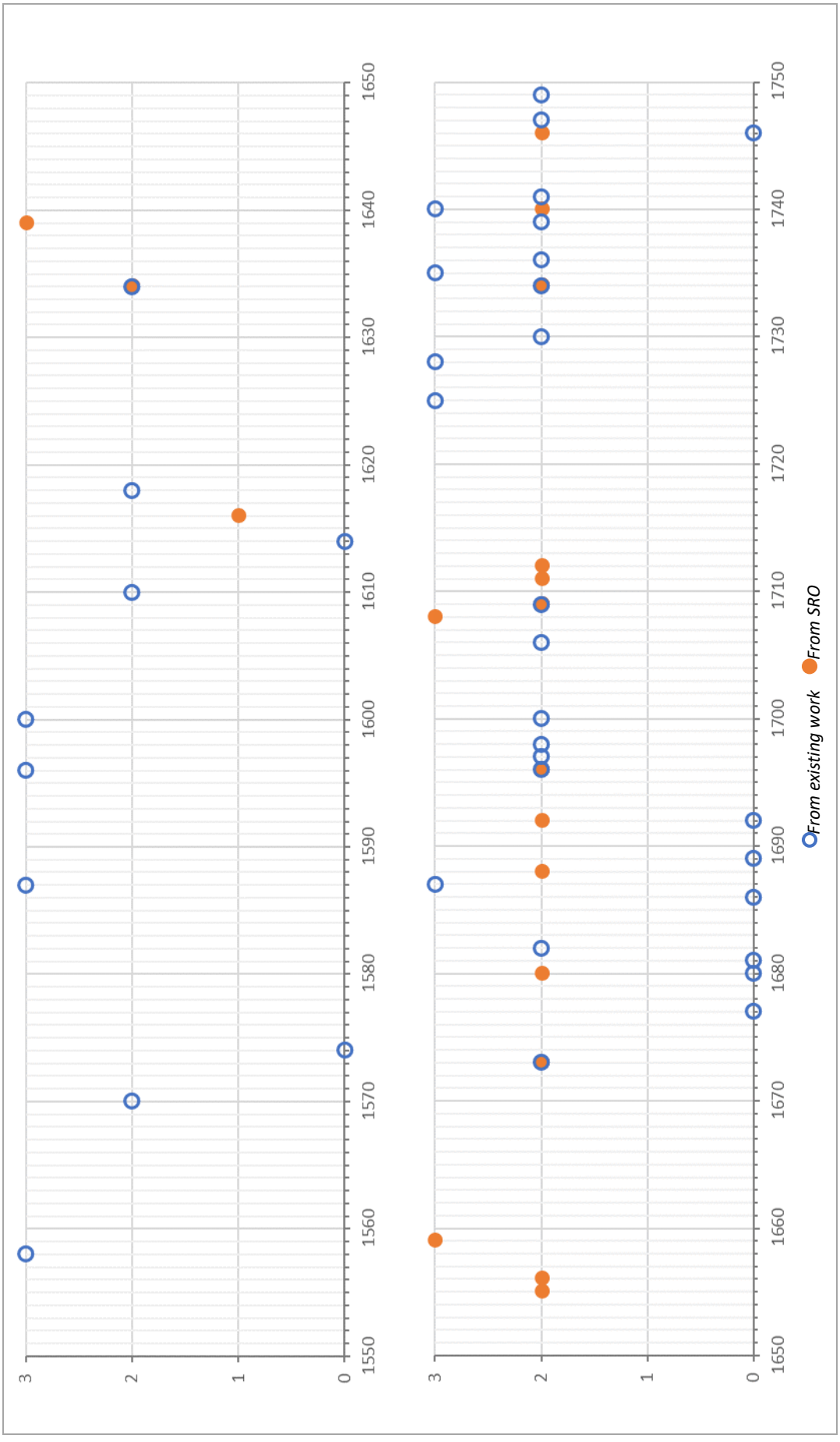

Figure 4.2: Severity of recorded flood events on the Trent

4.2 Contemporary explanations for flood events

The mechanisms that caused flooding are rarely described in administrative records for the sixteenth to eighteenth centuries, but the routine nature of these records results in the presence of a mostly consistent record and when viewed as a whole they can be extremely useful for understanding past flooding. However, when an explanation for a flood event is given it must be subject to some scrutiny. The types of records examined will likely affect the narratives that are presented. Court records and legal documents are less likely to include the providential explanations seen in the pamphlets Morgan examines,[57] nor are descriptions likely to be expressed in modern meteorological terms. The millers, shoemaker or cobbler, other tradesmen, householders, and landowners affected by the 1708 flooding in Rugeley did not have modern meteorological or hydrological training that would allow them to describe the flooding in terms recognisable today. Instead, they were far more concerned with the damage inflicted and its impact on their dwellings and livelihoods. Explaining the flooding was not as important an issue to them, or the parish officers, as the practical issues of recovery from the flood was. Nevertheless, there is some context given as there was "a great Rain,"[58] suggesting perhaps sudden intense rain or a storm causing flash flooding.

Narratives of flooding are shaped by the ways in which they are recorded. The petition by the inhabitants of Combridge previously discussed (2.2.2 Bridges) mentions "frosty weather by reason of Ice" as a recurring hazard,[59] suggesting snowmelt and ice as a frequent cause of flooding. As this is a petition by a community to receive aid from the county, there was a need to prove that the problem was significant enough to warrant support from the court, therefore requiring them to prove that the flooding was a repeated occurrence and having disruptive effects on community and infrastructure. The Quarter Sessions contain eighteen records which specifically concern flooding in the period 1550 to 1750, including two for the same incident, which compared to over two hundred records for bridges suggests that flood damage might not always be explicitly attributed to flooding when it appears in the sessions (Table 4.4, , 2.2.2 Bridges). The eighteen records of flooding include proportionally

[57] Morgan, "Understanding Flooding in Early Modern England."
[58] SRO D3243/4/1.
[59] SRO Q/SR/293/4.

more presentments and indictments than the records of bridges, and no accounts or financial records, the largest category of the bridge records. Although there is some overlap between these two groups of records, there is still a substantial difference between how flooding is presented to the Quarter Sessions and how bridges are presented (five records are for bridges damaged by flooding as in Combridge, and therefore appear in both sets of records). The priorities of the court when repairing a bridge were therefore more frequently the civil role of the court in managing infrastructure, while proceedings involving flooding are more likely to be criminal or punitive.

Table 4.4: The number of records concerning bridges and floods in the Quarter Sessions rolls by type (percentage of total)

	Bridges		Floods	
Accounts and financial	70	(33)		
Presentments	64	(30)	**7**	(39)
Writs	16	(8)		
Petitions	12	(6)	**1**	(6)
Indictments	12	(6)	**6**	(33)
Orders	10	(5)		
Certificates and reports	10	(5)	**1**	(6)
Testimonies	9	(4)	**2**	(11)
Agreements	4	(2)		
Miscellaneous	6	(3)	**1**	(6)
Total	213		18	

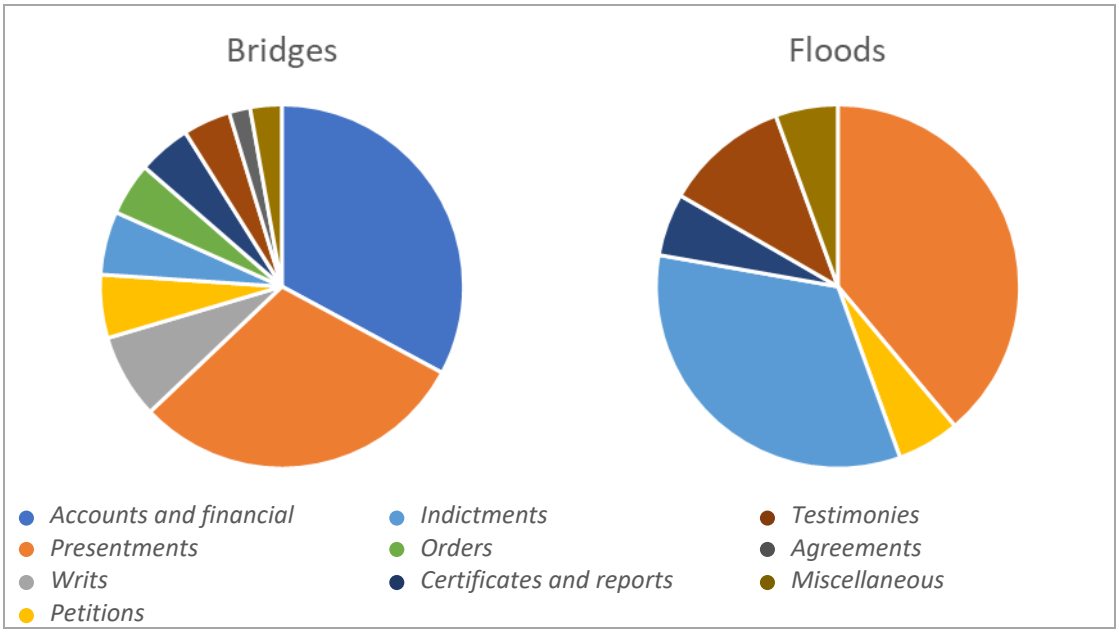

Figure 4.3: The number of records concerning bridges and floods in the Quarter Sessions rolls by type

The need to present a legal case affected the ways flooding is described, whether that meant providing evidence of fault by a party, a case for how things "should" be, or a responsibility. An appeal to precedence and community memory as discussed in Chapter 3 appears in Quarter Session records. At the Easter sessions in 1666, the court ordered a

"search of ancient records" to establish which towns or persons were responsible for their own bridge repairs, in order to reduce the burden on the county.[60] In 1692, the ancient course of a brook was used in a case regarding a damaged road in Wolverhampton. Apparently, one John Holnick "had filled up an ancient watercourse," causing the road to flood. The ancient nature of the brook justified John Holnick being obliged to maintain (and not obstruct) it.[61]

An indictment requires a claim of an individual's fault. As God or nature cannot be indicted (or pay for repairs), a human culprit is needed. Thus, the blame for flooding is unlikely to be placed on natural events and instead is described as the result of human activity. When flooding appears in the Quarter Sessions rolls, eleven of the eighteen records describe humans as responsible for flooding, and every single indictment describes a human cause of flooding. Negligence was frequently a reason for issues seen in Quarter Sessions, manor courts and with Hopwas Bridge in the Assize courts. As landowners were responsible for their own riverbanks and flood defences (3.5

Legal settlements), they could be prosecuted for not maintaining them if flooding occurred, particularly if the effects were as serious as the shifting of a county boundary as with the River Dove (2.2.2 Riverbanks). Often, humans were considered actively responsible for flooding, such as by blocking a ditch or, as in five cases, working a forge, mill, or floodgates. When no cause is given for flooding, it is often because flooding is being described as a cause of a damaged bridge or is being discussed in abstract terms rather than referring to a specific event, a common phrase being "in times of floods." A natural cause of flooding was only given in one case, the petition for Combridge, for which there was a clear need to refer to natural processes to prove to the court that assistance was required from the county.

[60] SRO Q/SR/332/19.
[61] SRO Q/SR/413/18.

Table 4.5: Flooding in the Quarter Sessions rolls and the cause ascribed to it

Session	Record type	Brief details	Cause of flooding
Trinity 1634	Certificate of damage	Salter's Bridge damaged by flooding	None given
1655	Indictment	Highway flooded at Coven Heath due to stopped watercourse at Brewood Forge	Human activity (forge)
Epiphany 1656	Petition	Bridge repeatedly damaged by flooding and ice	Natural - ice
Epiphany 1657	Presentment	Ditch and causeway described as in good condition, but a customary right of way is claimed in times of flood	None given
Translation 1657	Indictment	Humphrey Hall not maintaining riverbank forming the county boundary, thereby causing flooding of the Dove	Human negligence
1659	Presentment	Elizabeth Broughton and Richard Wall accused of neglecting river defences, resulting in flooding altering the course of the river (and county boundary)	Human negligence
1773	Indictment	John finch working a forge on the Stour at Amblecote, causing an obstruction and flooding a highway	Human activity (forge)
[nd] 1680	Complaint	The wooden bridge in Trentham in disarray, causing danger to travellers in times of floods	None given
Translation 1688	Presentment	Ralph Rowley pounding water above Cheddleton Mills, causing danger to the public	Human activity (mill)
Easter 1692	Presentment	John Holnick filled up an ancient watercourse, so the brook floods a road in Wolverhampton	Human activity
1696	Indictment	Humphrey Swan flooding a meadow and pasture in Penkridge by opening flood gates	Human activity (flood gates)
1708	Testimony	John England, miller, accused of stopping the River Tame and not securing the road between Tamworth and Hopwas	Human activity (mill)
Easter 1709	Presentment	Inhabitants of Uttoxeter still employed in the repair of Dovebridge lane by making sluices and ditches to alleviate flooding	None given
Translation 1711	Presentment	Two bridges damaged by floods and as they are county bridges and thus should be repaired by the county	None given
Easter 1712	Testimony	Inhabitants of the north of the Totmonslow Hundred requesting that the bridge over the Churnett to be replaced with a stone bridge due to floods making the roads impassable	None given
Epiphany 1734	Indictment	John Rowley charges with stopping and filling up a ditch/drain between Darlaston and Walsall causing danger to people and animals	Human activity
Easter 1734	Presentment	The ditch made by John Rowley sufficient and open	Human activity
Easter 1746	Indictment	Joseph Gibbons obstructed a watercourse called Park Lane Brook using gravel and other materials causing it to flood the Sedgley to Wolverhampton road	Human activity

How much can these descriptions of flooding be trusted? From the evidence in the Quarter Sessions alone, it would appear as though many of these flood events are as simple as someone opening floodgates and inundating someone's meadow, as described in 1696 in Penkridge. However, a number of these seemingly petty incidents coincide with years for

which the Chronology of British Hydrological Events has entries for flooding somewhere else on the Trent. For instance, in 1673 the sessions describe a forge blocking the Stour, however the CBHE has entries for the same year showing extensive flooding in Derbyshire, including two feet of water in St Werburg's church in Derby on the nineteenth of July, which would have occurred between the Trinity/Translation sessions and the Michaelmas ones.[62] It is therefore important to interrogate the narratives presented by these records by comparison with known flood evens and (where available) precipitation in order to determine whether they can be linked to wider patterns of flooding.

Determining to what extent precipitation contributed to any specific flood event can be challenging in this period. It would be ideal to be able to compare the data from Staffordshire with rainfall records. The first UK rainfall records were made in 1677 in Lancashire, unfortunately, rainfall datasets are scarce for the period prior to 1750 and systematic measurement of rainfall across the UK did not begin until the advent of the British Rainfall Organisation in 1860.[63] The oldest regional instrumental weather records exist from Chatsworth in Derbyshire from 1760, which are used as a comparison for Staffordshire by Harvey-Fishenden in examining drought impacts.[64]

Craddock provides yearly precipitation from 1725 drawn from the series of *10-year Meteorological summary books* held by the Met Office for Devon and Cornwall, London, the East Midlands and Yorkshire, expressed as a percentage of normal, and estimated monthly rainfall for the East Midlands from 1726.[65] Rainfall records do exist for other sites in the early eighteenth century, including Kew (South London), Oxford (Oxfordshire) and Spalding in Lincolnshire,[66] however the distance to Staffordshire from these series would introduce considerable uncertainty, particularly when considering the mundane, although underlying

[62] SRO Q/SR/361/7; CBHE 7904.
[63] Pedgley, "A Short History of the British Rainfall Organization."
[64] Alice Harvey-Fishenden, Neil Macdonald, and James P Bowen, "Dry Weather Fears of Britain's Early 'Industrial' Canal Network," *Regional Environmental Change* 19, no. 8 (2019): 2325–37, https://doi.org/10.1007/s10113-019-01524-5.
[65] Craddock, "Annual Rainfall in England since 1725," 823; J. M. Craddock, "Monthly Rainfall Totals Representing the East Midlands for the Years 1726 T0 1975," *The Meteorological Magazine* 106, no. 1257 (1977): 97–111.
[66] B. Todd et al., "Severity, Duration and Frequency of Drought in SE England from 1697 to 2011," *Climatic Change* 121, no. 4 (2013): 673–687.

dry and wet phases may persist across such distances.[67] Both yearly and monthly rainfall can be useful here, depending on which source material is being compared. Yearly rainfall can be compared with records where the date of the event is uncertain. For instance, bridge repairs in the Quarter Sessions might appear some time after the actual damage and not provide details of when the flooding occurred, and appear to show little connection to annual rainfall (Figure 4.4, c). Damage to bridges was also potentially cumulative, being the result of both use of the bridge and repeated severe weather. However, when the date of a flood event is known or there were multiple events in the same year, monthly rainfall is a more accurate comparison. For these purposes, floods mentioned in the Quarter Sessions have been presumed to be during the three months prior to that session unless specifically mentioned otherwise.

Between 1725 and 1750, flood events on the Trent are recorded in years with both above and below average rainfall for the East Midlands (Figure 4.4, a), and the events known to have occurred in Staffordshire are both from dryer years, with little in the preceding months to indicate unusual precipitation (Figure 4.4, b). These events appear to be mundane occurrences and conditions more local to Staffordshire probably contributed to these events. In 1734, the flooding of the road between Darlaston and Walsall occurred during a period of lower rainfall and is attributed to a blocked ditch.[68] Likewise, the 1746 event is attributed to a blocked brook by the Quarter Sessions.[69] It is likely not coincidental that both events recorded in the Quarter Sessions concern roads damaged by a blocked watercourse, as previously discussed, flooding was more likely to become the concern of a local court when it affected multiple parties or infrastructure, rather than only one individual (2.2.1 Manor courts). Although a direct comparison between flood events and known rainfall data has apparently indicated little relationship between the two, it may be that there are other ways of analysing this data that are more illuminating.

[67] Macdonald and Sangster, "High-Magnitude Flooding across Britain since AD 1750."
[68] SRO Q/SR/553/15.
[69] SRO Q/SR/598/5.

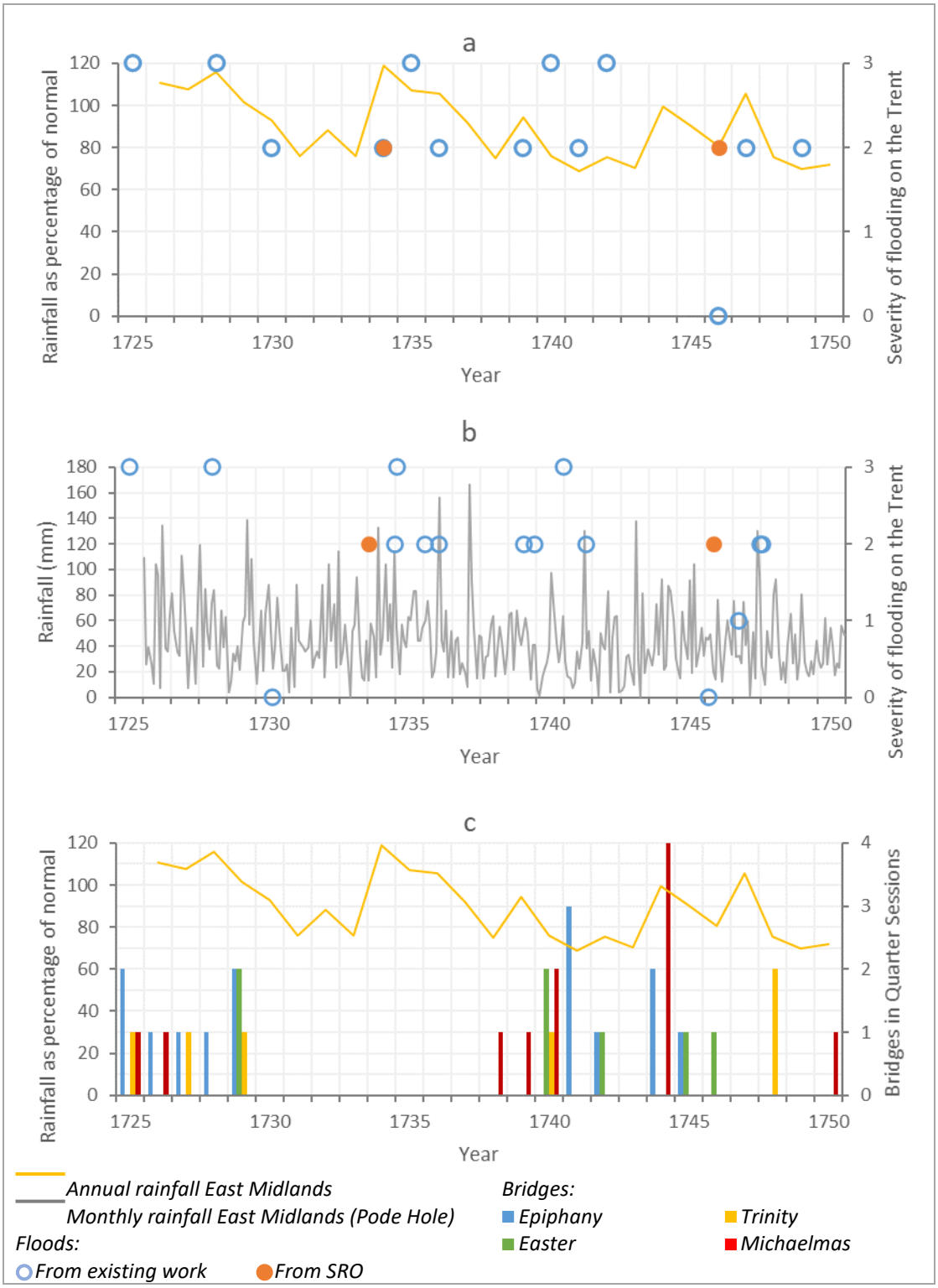

Figure 4.4: (a) Yearly rainfall data for 1725 – 1750 against known flood events; (b) Monthly rainfall data for 1726 – 1750 against known flood events; (c) Yearly rainfall data for 1725 – 1750 against bridges recording damage in the Quarter Sessions.

Table 4.6: Flood and other relevant events affecting the River Trent or Staffordshire 1725 - 1750

From existing flood series				**From material in the Staffordshire Record Office**		
British Chronology of Hydrological Events (narrowed to Trent) http://www.cbhe.hydrology.org.uk/		CBHE		QS		Quarter Sessions Rolls
TEMPEST https://www.nottingham.ac.uk/geography/extreme-weather/search/		TEMP		APR		Alrewas Parish Register (weather events, drownings and other possible disruption)
The Gallery of Natural Phenomena (narrowed to events likely to affect the Trent: specific locations on the Trent or nation-wide weather) http://www.phenomena.org.uk/		GNP				
Event	**Month/ Season**	**Source**	**Year**	**Source**	**Month/ Session**	**Event**
In Burton Joyce the church was liable to damage from floods, being only 160 yards from the Trent. In 1725 there was a particularly damaging flood and churches throughout the country were asked for help in raising the money needed for repairs.		CBHE	1725			
			1726			
			1727			
A great flood in Nottingham, "the like of which had not been known within the memory of people then living," known as the midsummer flood.	Jun	CBHE	1728			
			1729			
In Selford a potential waterspout was sighted over the River Trent causing flooding	Aug	CBHE	1730			
			1731			
			1732			
			1733			
"The late heavy Rains have laid most Part of the lowlands in this Kingdom under Water [...] Especially from Staffordshire they write (a County abounding with Rivers) that their Meadow-Lands are covered with Water for several Miles about. [...] in Scotland and the remote Parts of England, where we hear it is impossible to travel without great Hazard of their Lives."	Dec	CBHE	1734	QS	Epiphany	A ditch/drain in Buttcroft Lane on the road from the village of Darlaston to Walsall stopped up, thus causing "danger" to people and animals using that road.
				QS	Easter	Presentment that the stank (ditch) in the road in the parish of Wednesbury is sufficient and open, and not a nuisance or danger to the road.
Jan 8th a gale "the most violent since 1703"	Jan	GNP	1735			
Jan 11th the River Trent was so high that the bridge was destroyed and impassable, travellers from the North to London had to go via Nottingham.	Jan	CBHE				
Jan 18th "The Waters are so much out about Hull, Stone, Newark, Tucksford, &c. that Travellers hardly ever went in more Danger of their Lives."	Jan	CBHE				
Midsummer flood on the Trent: "The water in many of the houses near to the Meadows was two or three feet deep. A vast deal of hay was spoiled, and other damage done to a very serious extent."	Jul	CBHE	1736			

Flooding cut off communication over the Trent		CBHE				
			1737			
			1738			
The 'Newcastle Waggon' was lost in a flood when attempting to cross the Trent by Muskham Ford. Rain every day at the end of Jul until Aug[?] 8th including flooding at Tamworth. Severe winter, "Great frost" began Dec 25th and northerly winds until summer.	 Jul Dec	CBHE CBHE GNP	1739			
Very cold By Dec 8th there had been continual flooding for more than a fortnight and snow melt with rain on the 8th caused the "greatest flood that has been known for many years"	Jan Dec	GNP CBHE	1740	APR APR	Jan Dec-Feb	"A great frost in Anno Domini 1740 the beginning of this year" George Lucas drowned crossing Whichnor Bridge while travelling home between 9 and 10 at night on Dec 21st, it being "a very tempestuous snowy night" and was not found until Feb 6th
Water scarcity A small flood Oct 23rd and larger Oct 26th on the Tame.	Jul Oct	CBHE CBHE	1741			
Storms in Stafford in late Jun, flooding 25th	Jun	TEMP	1742			
			1743			
			1744			
			1745			
Frost and snow untill Feb 14th and a flood on the Tame on the 15th	Feb	CBHE	1746	QS	Easter	Gravel and other materials obstructing Park Lane Brook causing it to overflow and flood part of the Sedgley to Wolverhampton road.
Mar 22nd a foot of snow fell and melted by noon (River Tame) Dec 9th snowmelt caused "a great flood"	Mar Dec	CBHE CBHE	1747			
			1748			
So much rain and snow that the Tame was high for 5 or 6 and navigation of the Thames and Severn stopped.	Jan	CBHE	1749			
			1750			

4.3 Flood rich periods

There are few studies that have identified flood rich periods based on source material in archives in the UK before 1750. [70]A palaeoflood series for the Severn exists based on

[70] Macdonald et al., "Historical and Pooled Flood Frequency Analysis for the River Tay at Perth, Scotland."

sediments, however this is more representative of mid-Wales than Central England, [71] and Keith Challis et al have presented a geoarchaeological analysis of the development of the Trent catchment. Several periods of flooding in Staffordshire can be identified by combining entries in the CBHE with examples found during this study. There are a few clusters of floods that can be confidently identified before 1650. Between 1610 and 1618 there are four recorded flood events, two from Derbyshire and one from Staffordshire (Figure 4.5). The apparent period from 1634 to 1642 is misleading, as the 1642/3 flood event was caused by inhabitants of the Isle of Axeholme breaking down flood gates at Misterton Soss on the River Idle to prevent the advance of Royalist troops.[72] There has been a long history of flooding lands to prevent/hinder troop movements, with similar practices recorded by Adriaan de Kraker in the low countries during the same period, and these events do not indicate a flood rich period.[73]

There is more data for 1650 onwards, showing three flood events in Staffordshire between 1655 and 1659, several across the late seventeenth century, four events in Staffordshire between 1708 and 1712, and another possible period in the 1730s to 40s (Figure 4.2). The recurring issues with Hopwas Bridge in the 1650s were discussed previously, along with the potential link to flooding at the time (2.2.2 Bridges). If it was the case that the issues with Hopwas Bridge were due to flooding, it is worth examining whether bridge repairs can be linked to other known flood events, with a weak link between bridges and flooding (Figure 4.5). The 1650s saw a peak in bridge repairs, which then drop before the late seventeenth century, although it is not clear whether or not this was related to political events and a need for repairs after years of neglect during the Civil War. There also appears to have been an increase in repairs corresponding with the 1708 to 12 period, and again in the 1740s. One issue with drawing any conclusions from this is that the bridge repairs often appear to peak before the flood events. Flooding is explicitly mentioned in relation to bridge repairs in the Quarter Sessions in 1634, 1656, 1684, 1711 and 1712. The majority of these have been included in the data of flood events, so represent some overlap between the two data

[71] Anna F Jones, Mark G Macklin, and Paul A Brewer, "A Geochemical Record of Flooding on the Upper River Severn, UK, during the Last 3750 Years," *Geomorphology* 179 (2012): 89–105.
[72] CBHE 11281
Note: This flood event is entered as 1642, however the quotation provided says "1642/3."
[73] Adriaan de Kraker, "Storminess in the Low Countries, 1390-1725," *Environment and History* 19, no. 2 (2013): 149–71.

series. However, both the 1656 and 1711 coincide with years when there were peaks in the numbers of bridges appearing in the sessions. The 1684 Quarter Session entry for a bridge and causeway damaged by flooding is the only one that could not be used as part of this data series, as it is not clear whether the entry refers to flooding from 1684 or a previous year, however Macdonald records a large flood at Nottingham in February 1684, being the earliest estimated flood to exceed 1000 m^3s^{-1}.[74] It is notable that the flood rich phases identified here do not correlate to any of those identified by Günter Bloschl et al on a European scale, the only exception being 1610 to 1618, which coincides with an increased period of flooding in Iberia; this likely reflects the scales and types of flood events often considered.[75]

On a localised level, it may be possible to make use of manor court records as they regularly dealt with issues related to drainage (usually scouring ditches). The pains in the Trentham Manor records (2.2.1 Manor courts) do not provide a long series of data, but there does appear to be a correlation between the pains and known flood events, with three flood events occurring in Staffordshire during a period of increased regulation of drainage in Trentham (Figure 4.6). It should be noted that both the 1734 and 1746 events occurred on the Tame, a tributary that joins the Trent in Wychnor in south Staffordshire, roughly fifty kilometres downriver of Trentham. However, the issues in Trentham may still be associated with local flooding as both the recorded flood events and the issues in Trentham could be symptomatic of problems occurring in other manors in Staffordshire. When the rainfall data from the East Midlands is compared with the pains, there appears to be no correlation between the two (Figure 4.6). For issues as localised and mundane as drainage, data for rainfall or flooding needs to come from as close to the area as possible in order to accurately assess whether they are part of wider patterns of flooding or indicative of local issues, such as thunderstorms which might be more severe in one sub-catchment than the next one.

[74] Macdonald, "Reassessing Flood Frequency for the River Trent through the Inclusion of Historical Flood Information since AD 1320."
[75] Blöschl et al., "Current European Flood-Rich Period Exceptional Compared with Past 500 Years."

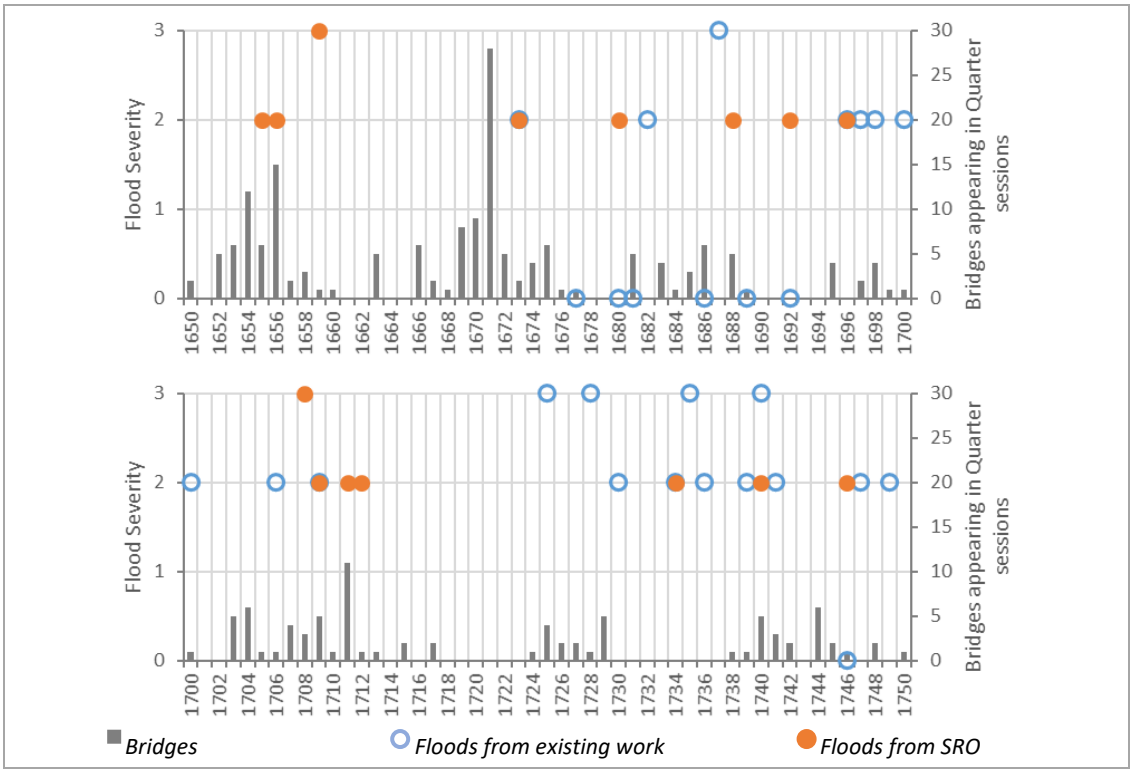

Figure 4.5: Flood events and bridges in the Quarter Sessions, 1650-1750

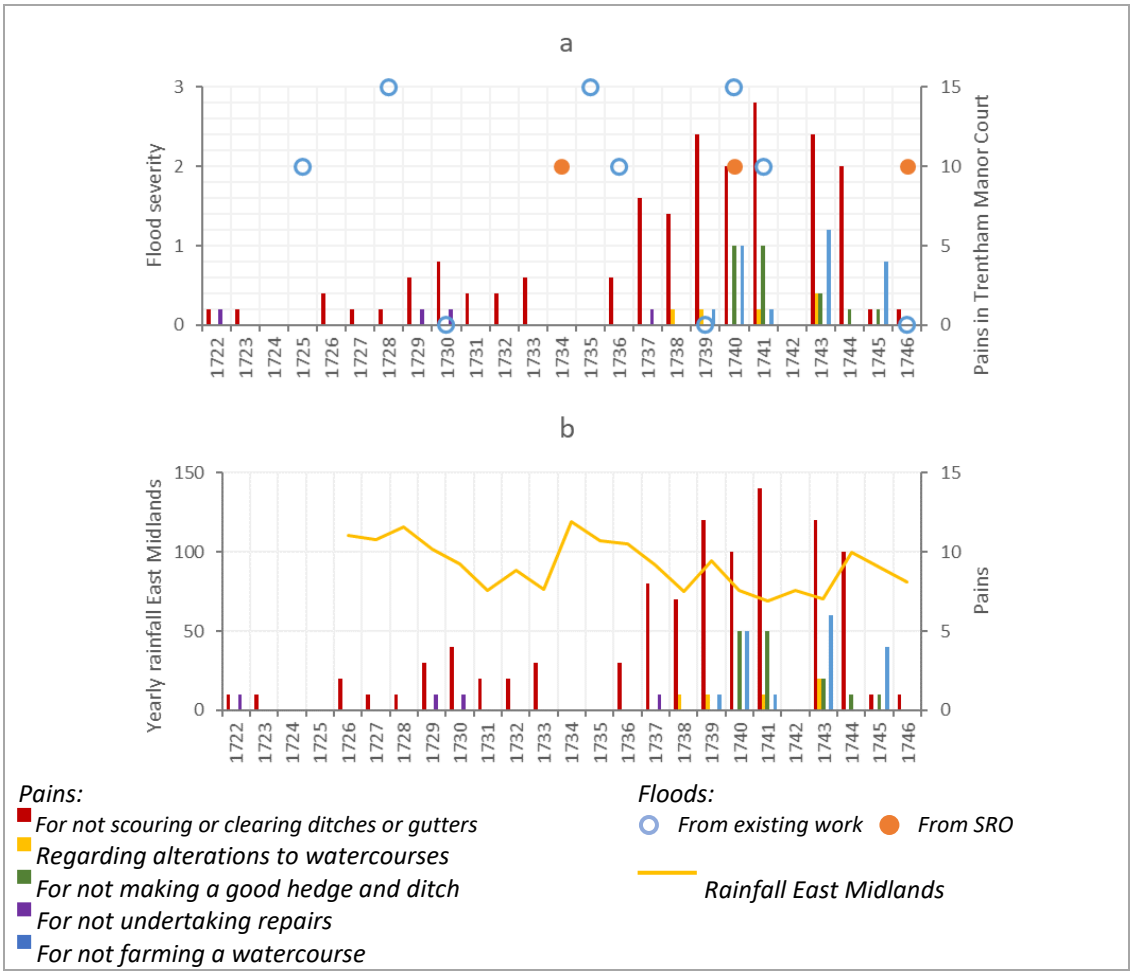

Figure 4.6: Pains in Trentham manor records 1722-1746 and (a) flood events (b) yearly rainfall in the East Midlands

4.4 Seasonality

Assessing the seasonality of flooding is useful for evaluating flood risk, particularly for planning construction adjacent to a river or activities which are seasonal, such as agriculture.[76] Analysis of flood seasonality is normally achieved using gauged data,[77] and has thus focused on the second half of the twentieth century onwards, as this period reflects the greater presence of instrumental records.[78] However, just as climate has changed over time, so may flood seasonality. This was noted by Bloschl et al who identify the current flood rich phase to be the first to have occurred during a warm period, as previously flood rich phases could be attributed to intervals with cooler climates.[79] Studying flood seasonality over longer timescales is valuable as it can provide greater accuracy in flood risk assessment, as well as benefitting historical research, particularly environmental and agricultural history.

Unfortunately, the data that can be gleaned from the sixteenth to eighteenth centuries is considerably less rigorous than gauged data. Macdonald has studied the seasonality of flooding on the Ouse since 1600, and notes that records from the nineteenth century onwards are significantly more complete than those prior.[80] The records for Staffordshire, both from this research and from the CBHE are seldom specific about the date, height or magnitude of events, and as it is not always clear how large an area was affected by any particular flood event or whether its cause was natural or human. The documentary sources in archives used for understanding flooding have often been heterogeneous, gathered from different sources across archives rather than one series, and many studies into historical seasonality of flooding and weather are the product of many years' effort and accumulated data, as with Dario Camuffo et al's examination of hail- and

[76] David R. Archer, "Seasonality of Flooding and the Assessment of Seasonal Flood Risk," *Proceedings of the Institution of Civil Engineering* 70, no. 2 (1981): 1023.
[77] Neil Macdonald, "Trends in Flood Seasonality of the River Ouse (Northern England) from Archive and Instrumental Sources since AD 1600," *Climatic Change* 110, no. 3–4 (2012): 901–23.
[78] For example: Andrew R. Black and Alan Werritty, "Hydrology Seasonality of Flooding: A Case Study of North Britain," *Journal of Hydrology*, vol. 195, 1997.
[79] Blöschl et al., "Current European Flood-Rich Period Exceptional Compared with Past 500 Years."
[80] Macdonald, "Trends in Flood Seasonality of the River Ouse (Northern England) from Archive and Instrumental Sources since AD 1600."

thunderstorms in Italy.[81] Databases such as the CBHE can be useful for gathering this data and helping in creating a more complete record, which may help to make up for some of the shortcomings of any one source. As a result of the difficulties with the data, Macdonald notes that approaches to studying flood seasonality since 1800 do not work when the data is as incomplete as for the early modern period.[82]

This incompleteness was certainly true of the data from Staffordshire if used for examining seasonality, as the majority of records did not give a day or month for flood events or only referred to flooding in the abstract, such as "in time of great floods."[83] Occasionally, the researcher can be fortunate and encounter a more specific reference. For example, on the twenty-seventh of February, 1762, William Wyatt, the "most faithfull serv[an]t" of the Earl of Uxbridge, sent the earl a lease for a forge (formerly fulling mill) in Burton-on-Trent with a letter describing the property, and noted that:

> The situation in respect to carriage makes the works much more valuable than they would otherwise be for [the] water is very inconstant there being often long floods in winter and great scarcity in summer which scarcity is in great measure owing to the gates put up by Mr Hayne[84]

Both the seasonality of flooding and shortage of water were sufficient to reduce the functionality of the forge and make the periods in which it could work "much more valuable." The flooding appears to have been more than occasional, and is described as "long," suggesting significant lengths of time during which flooding affected the forge. More consistent, but not without their own issues, are records of court proceedings. As courts were held regularly, they may provide more regular records of floods and one might hope they would provide indication of seasonality. There is some variation in the dates of Quarter Sessions (2.2.2 Quarter Sessions and Assizes), but as they were associated with legal terms, the variation is small.

[81] Dario Camuffo, Claudio Cocheo, and Silvia Enzi, "Seasonality of Instability Phenomena (Hailstorms and Thunderstorms) in Padova, Northern Italy, from Archive and Instrumental Sources since AD 1300," *Holocene* 10, no. 5 (2000): 636.
[82] Macdonald, "Trends in Flood Seasonality of the River Ouse (Northern England) from Archive and Instrumental Sources since AD 1600."
[83] SRO Q/SR/381/6.
[84] SRO D603/E/1/172.

In the Quarter Sessions records for Staffordshire, more Trinity/Translation (summer) sessions mention bridges than any other, with the Michaelmas (autumn) sessions being the least likely session for bridges to be an issue (Figure 4.7). However, when bridges were mentioned in the Michaelmas sessions, there were more likely to be several bridges that needed repairing, for example there were thirteen in 1671. Overall, the Easter sessions tended to see fewer issues with bridges, both in terms of frequency of occurrences and the number of bridges damaged at any one time (Figure 4.7). The difference between sessions is not vast but is enough that it might reflect seasonal weather and repair work. It seems reasonable that ideally repairs would be undertaken in summer during warmer weather, so repairs due to wear and tear might be raised at the summer Trinity or Translation session. This may be why the work on the new bridge at Hopwas in 1663 was planned to take "two summers" rather than two years.[85] However, when bridges did need repairing in less ideal conditions of autumn and winter, it would have been the result of flooding or storms, thus several bridges appear at once.

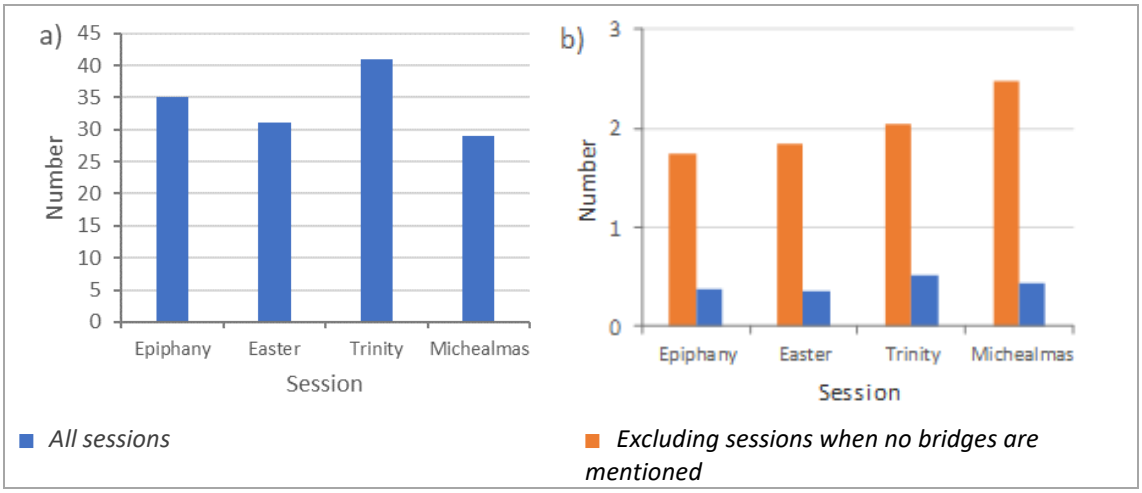

Figure 4.7: Frequency of bridges appearing in Quarter Sessions: (a) number of years in which bridges appear, by session, and (b) a "typical" year – the mean number of bridges appearing each session
Entries where the session is unknown have been excluded

However, the distinction made by Veale et al. when creating the *TEMPEST* database between the date of a weather event and the date of document creation is an important one.[86] Among the records consulted here, few were made at the time of the event described. Interpreting any patterns in the Quarter Sessions relies on recognising that

[85] SRO Q/SR/321/3.
[86] Veale et al., "Dealing with the Deluge of Historical Weather Data: The Example of the TEMPEST Database."

orders in the sessions reflect damage prior to the sessions, but work undertaken after them: i.e. an order to repair a bridge in the summer sessions reflects damage from before July, but the hope that the repairs be completed between July and September (when the next sessions are). Likewise, as the sessions were held in September to October, any repairs were ordered to be undertaken over the winter but reflect damage from late summer or earlier. After the initial order in the Trinity 1653 sessions to repair the bridge in Hopwas, the issue reappeared in the sessions the same year, then again in 1654, 1656, 1657, the Assize court in 1658, then the Quarter Sessions again in 1630 and 1633 (2.2.2 Bridges). Orders by the court were expected to be acted upon quickly, and could be pursued in future sessions, which may not consistently reflect when any flooding may have occurred. There are opportunities for further analysis, for instance four bridges appeared at the Michaelmas sessions in 1744, occurring in a year where the East Midlands saw an unusually dry July and August, followed by higher than typical rainfall in September and October.

Table 4.7: 25-year average rainfall (mm) for 1726-1750 and 1744, July to October from Craddock[87]

	July	**August**	**September**	**October**
25-year average	231.08	183.96	209.16	191.64
1744	85	100	343	327

However, damaged bridges were likely to reach the attention of the Quarter Sessions after attempts to secure repairs at a local level had failed, so the appearance of a bridge in the sessions may reflect damage from several months prior. Few of the entries in the Quarter Session rolls mentioning flooding give a date for the event. The petition from the inhabitants of Combridge mentioned previously suggests that flooding was a recurring issue, and not necessarily temporally close to the session in which it appears. [88] Nonetheless, the mention of frosty weather as particularly difficult and the occurrence of the petition in the Epiphany sessions may be more than coincidental. Although it was an ongoing problem for the inhabitants of Combridge, the lack of an adequate bridge was clearly a greater issue in the winter than at other times of year, which may have prompted the petition at the Epiphany sessions. When specific records are examined in closer detail and different methods of analysis are used together, local seasonal issues become more apparent.

[87] Craddock, "Monthly Rainfall Totals Representing the East Midlands for the Years 1726 T0 1975."
[88] SRO Q/SR/293/4.

Archer et al note that increases in flash flooding tend to occur during previously identified flood rich periods.[89] The 1730s-40s have been compared with monthly rainfall here and appear to have been a relatively flood rich period for the Trent (Figure 4.2). However, this period was not identified as such by Macdonald when examining the history of flooding at Nottingham, which suggests some caution should be applied.[90] When the whole 1550 - 1750 period is examined, eleven instances of sudden flooding or flooding associated with rain or storms appear, eight of which fall between June and September (Table 4.8). The infrequency with which flood events are recorded, and sparsity of the information given, means it is difficult to tell whether any of these events constitute flash-flooding, or whether they coincide with flood rich periods as Archer et al describe. It is nevertheless notable that the flood events recorded here are summer events, events often resulting from convective climate systems which exhibit high magnitude rainfall events, but that do not necessarily lead to widespread flooding as they are concentrated in smaller areas. Additionally, there are few floods recorded at Nottingham,[91] instead they are focused in the upper tributaries, where heavy localised rainfall may have a more notable impact. Macdonald et al also noted an increase in summer floods in the eighteenth century on the River Ouse at York, in stark contrast to more recent history as few notable summer floods have been recorded over the last century (aside from an apparent increased frequency in the last ten years).[92]

[89] Archer et al., "Historical Flash Floods in England: New Regional Chronologies and Database," 6.
[90] Macdonald, "Reassessing Flood Frequency for the River Trent through the Inclusion of Historical Flood Information since AD 1320."
[91] Macdonald.
[92] Macdonald, "Trends in Flood Seasonality of the River Ouse (Northern England) from Archive and Instrumental Sources since AD 1600."

Table 4.8: Sudden flooding and flooding associated with storms or heavy rain on the River Trent and its tributaries

Year	Month	Event	Source
1558	Jul	On Jul 7th near Nottingham, a storm and possibly a tornado resulted in six or seven fatalities.	CBHE & GNP
1570	Oct	On October 5th a storm had devastating effects on the east coast. An account describes strong winds and heavy rainfall aggravating flooding, including in Bedfordshire, Huntingdonshire, Staffordshire and Warwickshire, which overwhelmed defences.	CBHE
1584	Jul	Jul 24th lightning, hail and floods in England, people and cattle killed	GNP
1618	Sep	On Sep 4th in Wistow "About six in the morning the waters so increased that they prevailed to carry the bier about the church and ran over the communion table"	CBHE
1639	Jan	A "great and suddaine" flood destroyed the mill in Wombourne on Jan 28th	WPR
1673	Jul	St Werburgh's church in Derby flooded with 2 feet of water from Markeaton Brook on 19th Jul.	CBHE
1698	Oct	Wet with cold nights, and frequent rain throughout the summer caused flooding during late autumn, particularly at Derby.	CBHE
1708	Sep	Sep 15th “a great Rain” destroyed dams, floodgates, hedges and shops in Rugeley	RPO
1730	Aug	In Selford a potential waterspout was sighted over the River Trent causing flooding	CBHE
1739	Jul	Rain every day at the end of Jul until Aug(?) 8th including flooding at Tamworth	CBHE
1742	Jun	Storms in Stafford in late Jun, flooding 25th	TEMP

The relationship between seasonal flood repairs and flood seasonality is complex, with few instances of damage being directly attributed to flooding by the sources. The available record for flooding of the Trent with specified months of year is sparse as many records are vague. However, it is sufficient to compare with Macdonald’s findings for the Ouse. The records found for Staffordshire are few (only seven months across the whole period could be identified as featuring flooding), but they can be combined with the data from the CBHE for the Trent and data from Macdonald (Table 4.9; Figure 4.8). Even with the two combined, for the period 1550 to 1599 there is insufficient data to draw conclusions. For 1600 to 1649, most of the flooding occurred between December and March. In the latter half to the seventeenth century and the first half of the eighteenth two peaks in flooding appear – in the summer and the winter. Although the number of events where the month is identified is small, this can be combined with other data such as potential indicators of flood damage (bridges) and textual analysis of sources to build a more complete picture.

Flooding in the sixteenth to eighteenth centuries did not conform to the same seasonal patterns as flooding today. As mentioned, Macdonald identifies a reduction in summer flooding in York in the twentieth century compared to previous centuries,[93] and a high level of August-September flooding in 1700 - 1750, although autumn and winter were still the dominant seasons for flood events (Figure 4.7).[94] Given that the recorded events are weighted towards the higher magnitude events prior to 1800,[95] the large groupings of bridges being repaired in the Autumn is easily explicable. Severe June to September flooding could have led to damage to bridges across the county, and the need to undertake repairs before the winter may have resulted in many appearing in the Quarter Sessions at once, with this potentially more of a significant impact in the upland tributaries where convective storms might cause localised flooding. The rainfall data provided by Craddock for the East Midlands shows a tendency towards higher summer rainfall, with several years standing out for having a dramatic peak between May and September (May 1727, 1734; June 1726; July 1736, 1743; August 1737; September 1726, 1729, 1741, Figure 4.9). Although some doubt has been expressed about how reliably court records reflect the dates of flood damage, there does appear to be a relationship between Autumn bridge repairs and summer rainfall or storms.

Table 4.9: Seasonality (bi-monthly) of recorded floods for 50-year periods 1550 – 1750
(Percentage of floods within the given period)
Combining material from the Staffordshire Record Office, the CBHE and Macdonald (2012)[96]

			Bi-monthly												
			Dec-Jan		Feb-Mar		Apr-May		Jun-Jul		Aug-Sep		Oct-Nov		Total
Years and data sources	1550 - 1599	Staffordshire	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0
		CBHE - Trent	0	(0)	0	(0)	0	(0)	2	(66.7)	0	(0)	1	(33.3)	3
	1600 - 1649	Staffordshire	2	(66.7)	0	(0)	0	(0)	1	(33.3)	0	(0)	0	(0)	3
		CBHE - Trent	1	(25)	2	(50)	0	(0)	0	(0)	1	(25)	0	(0)	4
		Macdonald - Ouse	0	(0)	2	(66.7)	0	(0)	0	(0)	1	(33.3)	0	(0)	3
	1650 - 1699	Staffordshire	1	(33.3)	0	(0)	2	(66.7)	0	(0)	0	(0)	0	(0)	3
		CBHE - Trent	3	(27.3)	0	(0)	1	(9.1)	3	(27.3)	1	(9.1)	3	(27.3)	11
		Macdonald - Ouse	4	(66.7)	0	(0)	0	(0)	1	(16.7)	0	(0)	1	(16.7)	6
	1700 - 1749	Staffordshire	0	(0)	0	(0)	0	(0)	0	(0)	1	(100)	0	(0)	1
		CBHE - Trent	6	(40)	1	(6.7)	1	(6.7)	4	(26.7)	2	(13.3)	1	(6.7)	15
		Macdonald - Ouse	1	(16.7)	3	(50)	1	(16.7)	1	(16.7)	0	(0)	0	(0)	6

[93] Macdonald.
[94] Macdonald.
[95] Macdonald.
[96] Macdonald.

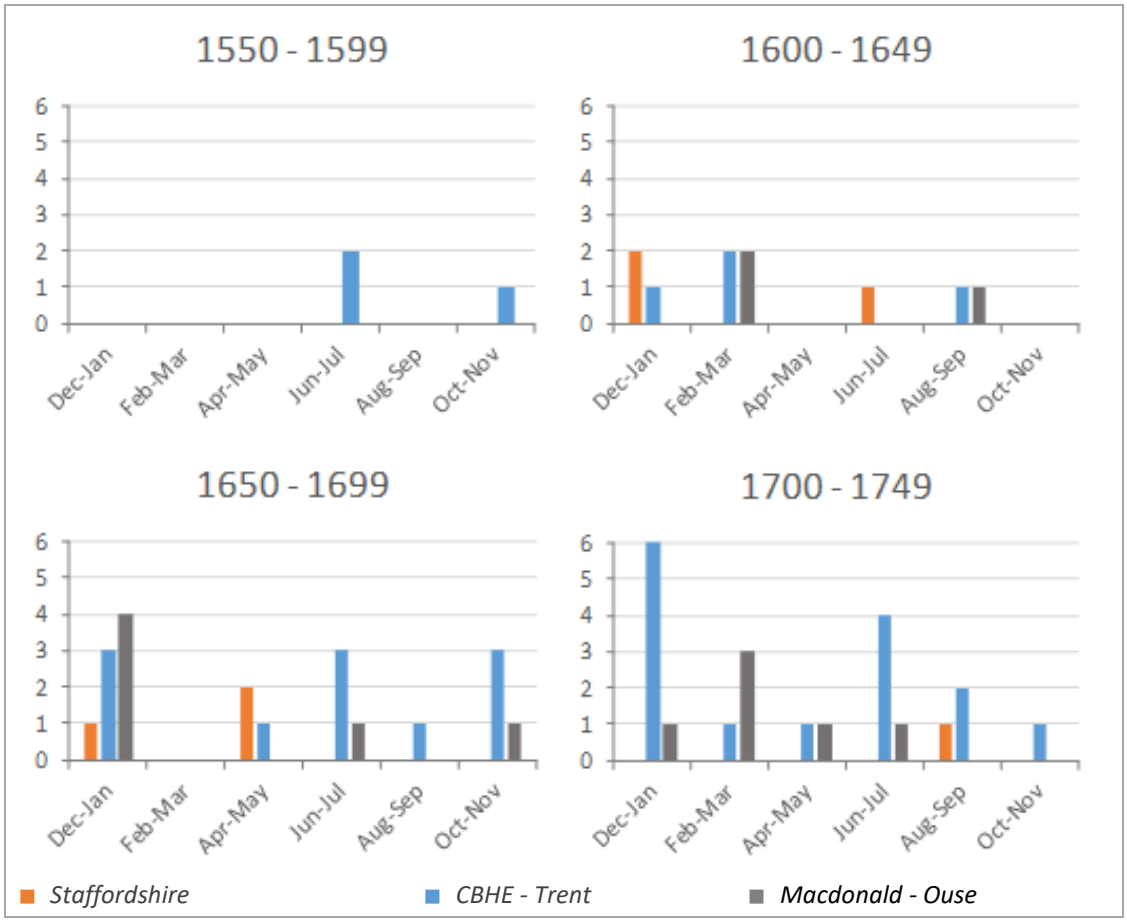

Figure 4.8: Seasonality (bi-monthly) of recorded floods for 50-year periods 1550 – 1750. Combining material from the Staffordshire Record Office, the CBHE and Macdonald (2012)[97]

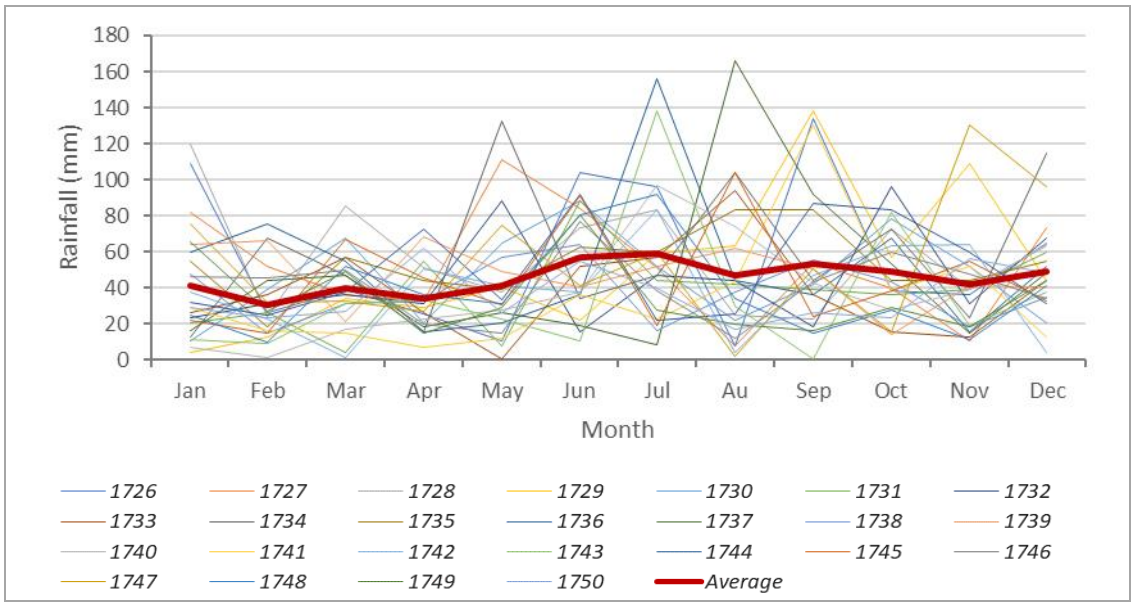

Figure 4.9: Rainfall for 1726-1750 from the East Midlands by month from Craddock[98]

[97] Macdonald.

The few instances where flooding is specifically mentioned in relation to a damaged bridge do not coincide with the Michaelmas sessions: in July 1634 flooding of the Mease is said to have damaged Salter's Bridge;[99] in January 1655/6 the inhabitants of Combridge produced the aforementioned petition;[100] in July 1711, the jury heard that four bridges had been destroyed by floods;[101] in April 1712 Wall Bridge over the Churnett needed replacing with a stone bridge due to flooding;[102] finally an undated entry (likely from 1680) describes danger to travellers over a bridge in Trentham due to flooding.[103] Clearly repairs were sometimes a response to flooding. However extreme or unusual floods were more likely to be noted, and regular, expected occurrences would not, and it may not have been usually considered worth recording in the Quarter Sessions if weather or flooding had not been exceptional.

Many of these recorded flood events were during winter and are attributed to ice and snow, usually during the subsequent thaw, with snowmelt the most frequently described cause of flooding in the winter months (Table 4.10). There were multiple problems associated with winter weather aside from flooding that are recorded, including the unusable bridge in Combridge in 1656, [104] the drowning of George Lucas on a "tempestuous snowy night" in 1740,[105] floating ice destroying the Trent Bridge in the winter of 1683-4, and multiple instances of snow or ice events recorded in the 1740s (Table 4.10). However, winter flooding cannot always be attributed to snow and ice. In Chapter 3 evidence of major repair work to the roof of Burton mills was found in November 1704, and it was suggested that one explanation could be storm damage. At the same time, there was a small increase in bridge repairs (Figure 4.5), but no known flood events, so this explanation would be purely speculative. There are also several recorded September to October storms (Table 4.8). Thawing ice and snow are the most frequently remarked upon but were not the only reasons for winter flooding.

[98] Craddock, "Monthly Rainfall Totals Representing the East Midlands for the Years 1726 T0 1975."
[99] SRO Q/SR/215.
[100] SRO Q/SR/293/4.
[101] SRO Q/SR/479/8.
[102] SRO Q/SR/482/30.
[103] SRO Q/SR/381/6.
[104] SRO Q/SR/293/4.
[105] SRO D783/1/1/1.

Table 4.10: Flooding and other riverine events associated with snow or ice

Year	Month	Event	Source
1610		Blizzards in Derbyshire and heavy rainfall causing three prisoners to drown in Derby jail.	CBHE
1614	Jan-Mar	Snow and frost Jan - Mar, thawing ice and snow caused flooding in Derbyshire	CBHE & GNP
1621		Nottingham Bridgemaster's accounts include 4s 8d paid to have ice under the bridge broken to provide passage.	CBHE
1682	Sep-Feb	A "severe" frost in Sep 1682-Feb 1683 in Nottinghamshire and Derbyshire. Fuel and food were in short supply and boats on the Trent were at a standstill.	CBHE
1683-1684	Sep-Feb	The Trent was frozen at Nottingham and when the frost broke up the bridges at Nottingham and Muskham were destroyed by floating ice, including Trent Bridge on 5th Feb	CBHE
1697	Dec	Flood at Gainsborough "ran against [th]e upper part of trees growing on Saundby Marsh bank." Downstream, riverbanks gave way and were breached. Then there were several days of fine weather. On 28th December it began to freeze again and the next day more snow fell bringing fears of "another great thaw and deluge."	CBHE
1740	Dec	By Dec 8th there had been continual flooding for more than a fortnight and snow melt with rain on the 8th caused the "greatest flood that has been known for many years"	CBHE
1746	Feb	Frost and snow until Feb 14th and a flood on the Tame on the 15th	CBHE
1749	Jan	So much rain and snow that the Tame was high for 5 or 6 weeks and navigation of the Thames and Severn stopped.	CBHE

4.5 Conclusion: Finding a record of mundane flooding

Examining mundane flooding in the ways demonstrated here is challenging, which may be why it is an unusual approach to take. However, it is possible. The mundane reveals parishes struggling due to an insufficient bridge in winter, the “ancient” watercourses obstructed and human negligence. It can also reveal recurring patterns: blocked ditches, summer storms, winter ice and snow. These types of records also present challenges for such analysis, as court records infrequently record the reason for damage to bridges or the date that damage has occurred. As court records are concerned with local administration, they present a specific narrative of flooding based on human liability for damage, for relatively local well-defined areas. However, the routine nature of these records can be a benefit, as the requirement for the court to be held results in the consistent presence of a record, even if that record is flawed.

The relationship between possible management of the effects of flooding, rainfall, and recorded flood events is not simple. Studying the mundane can be challenging in periods prior to the presence of regular instrumental data. The only available rainfall data for the Midlands in the period 1550 to 1750 only begins in 1725. In this chapter, data has been compared with known flood events, and records for bridge repairs and ditches to see

whether these could indicate anything about flooding even when not directly attributed to flood events. Because most of these issues are mundane, they are more subject to local conditions (and human involvement) than extreme events are. The use of indices to quantify descriptions of flood events can result in the loss of qualitative data, however when different forms of analysis are used simultaneously, this data is not lost. Several periods of increased flooding were identified in Staffordshire within the 1550 to 1750 period, including during the 1650s, between 1708 and 1712, and in the 1740s, with some relationship between these periods and increased repairs of bridges and issues with ditches. There was also evidence of damage from storms, rainfall, and flooding, often during summer, resulting in damage to bridges, and frequent flooding caused by snow and ice, usually during a thaw in spring.

Part 2: Archives and the environment

5 : Finding and cataloguing environmental data

> Memoranda include:
> Lists of constables and headboroughs, 1680-1746.
> Notes of charity bequests, e.g. William Chetwynd, 1691, Walter Landor, 1705.
> Damage caused by flood, 1708.
> Damage caused by a 'dreadful fierce fire', 1708.
> Copy account of money disbursed to those who received loss by fire (29 houses burned), with list of parishes and amounts collected by brief, 1649.[1]

This excerpt from the catalogue description of Rugeley Parish Officers' accounts (discussed in both Chapters 1 and 2) includes mention of the 1708 flood, and it was this description that indicated that it might be useful for this thesis. In contrast, many of the Quarter Sessions records and leases consulted could not be directly searched for with the term "flood." For example, the catalogue entry for a presentment from 1692 says:

> Presentment by Thomas Lane Esq., J. P. that the road in the parish of Wolverhampton between [?] and Willenhall is out of repair because John Holnick [?] had filled up an ancient watercourse so that water from the brook now turned into the road. Dated 5 Jan 1692[2]

This second example was found by reading each catalogue entry for the Quarter Sessions rolls to find relevant entries. Had the catalogue not been so detailed, the Quarter Sessions would need to have been consulted directly in order to identify the small fraction of relevant entries in the rolls, vastly increasing the workload (and likely preventing the Quarter Sessions being a viable source of data for a PhD project).

Neither of the original documents use the word "flood," therefore a decision had been made with the 1708 flood to describe it in the catalogue as a flood, while the cataloguing for the 1692 one closely matches the language of the record. This difference is potentially due to the differing circumstances of the creation of the catalogue data and standards used for cataloguing: the entry for the Rugeley Parish Officers' accounts are part of legacy data from before the creation of the online catalogue while the Quarter Sessions have been catalogued as part of an ongoing volunteer project. However, it is notable that the Rugeley event was caused by rain and was disastrous for the parish, while the 1692 event is

[1] SRO D3243/4/1.
[2] SRO Q/SR/413/18.

attributed to human activity and affected a single road. Whether the difference in scale of events and their human or natural cause affected the cataloguer's perception of events cannot be stated, although it is possible that the 1692 event was not perceived as flooding by the volunteer. The differences in how these two records were catalogued affected how readily they were identified for this thesis, and the search methods needed to find them.

Even when flooding is mentioned in catalogue information, there can still be difficulty in consistently finding relevant records. When preparing material for the research in Chapters 2-4, searching for different variations of the word "flood" in the Staffordshire Record Office online catalogue (*Gateway to the Past*) produced different results. "Flood" produced 176 results, "flooding" 112, "flooded" fifty-five and "floods" eighty-seven results. When narrowed to the 1550-1750 date range, the search produced fifteen, twenty, seven and eleven results each (Appendix II). Even when combined, these search results cannot be taken to be a complete sample of relevant material in the Staffordshire Record Office. Archivists have traditionally used the language of a record for description,[3] so if the record does not use the term flood, catalogue description will likely not either. This means that as well as "flood," it can be necessary to use search terms such as "inundation" or "high water." Even then, results can only be found when useful data is explicit in the source material, if it clearly mentions a flood (or uses equivalent terminology), and if the wording either occurs in the title of the document or the catalogue is detailed enough to include content information.

Difficulties in locating useful data are further compounded when the relevance is implicit rather than explicit, for instance if repair work after a flood is described, but the flood itself is not mentioned. Many historical climatologists use proxy data such as harvest dates to examine patterns in weather,[4] and such proxy data would not be found through directly

[3] Alicia Chilcott provides discussion of the problems presented when this results in description "inheriting" offensive language from records: Alicia Chilcott, "Towards Protocols for Describing Racially Offensive Language in UK Public Archives," *Archival Science* 19 (2019): 359–76.

[4] Brázdil, Wheeler, and Pfister, "European Climate of the Past 500 Years Based on Documentary and Instrumental Data"; Kjeldsen et al., "Documentary Evidence of Past Floods in Europe and Their Utility in Flood Frequency Estimation"; De Kraker, "Flood Events in the Southwestern Netherlands and Coastal Belgium, 1400-1953"; Pfister, Weingartner, and Luterbacher, "Hydrological Winter Droughts over the Last 450 Years in the Upper Rhine Basin: A Methodological Approach"; Pribyl, Cornes, and Pfister, "Reconstructing Medieval April-July Mean Temperatures in East Anglia, 1256-1431"; Werritty

searching flooding, but through looking for the relevant types of sources or other related terminology. These sources do not mention flooding, and are not "about" flooding, and therefore would not appear in searches for flooding at all.

Looking at archival literature and practice through the lens of the environment reveals a gap. The paradigms by which archivists have traditionally worked and catalogued are generally blind to the potential for environmental research. This chapter will examine these difficulties and discuss potential solutions for repositories looking to engage with environmental research, which, as mentioned in Chapters 1, 7 and 8, has potential both for audience development and for demonstrating the societal value of archives. This chapter will only focus on or recommend achievable measures that will be of help for environmental research. Therefore, problems like legacy data or lack of surviving records may be mentioned, but not directly addressed, as these are larger problems that are not specific to environmental research.

Archive users interested in the environment come from a variety of disciplines and bring different perspectives and forms of analysis to the archive. A social historian and an historical hydrologist might look at the same records in entirely different ways. There has been an awareness for several decades that both archivists and archive users bring their own perspectives to the archive.[5] As David Bearman argued, the record as an object of description is not the same as its existence as documentation of the activity of the record creator.[6] Archive description therefore represents one possible perspective of many, and this has led to scrutiny of the purpose of archival description. Whether description is a function of archive services has been questioned in favour of viewing it as the process of communication of archival records,[7] creating tension between information exchange and archival description as priorities.[8]

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et al., "Use of Multi-Proxy Flood Records to Improve Estimates of Flood Risk: Lower River Tay, Scotland."

[5] David Bearman, "Authority Control Issues and Prospects," *The American Archivist* 52, no. 3 (1989): 286–99.

[6] David Bearman, "Documenting Documentation," *Archivaria* 34 (1992): 33–49.

[7] Luciana Duranti, "Origin and Development of the Concept of Archival Description," *Archivaria* 35 (1993): 47–54.

[8] Jennifer Bunn, "Developing Descriptive Standards: A Renewed Call to Action," *Archives and Records* 34, no. 2 (2013): 235–47.

The role of archivists in shaping records has been recognised,[9] and archivists described as "mediators" who can be complicit in the viewpoints and definitions of institutions.[10] Michelle Light and Tom Hyry criticised the descriptive standards that archivists use for creating an illusion of objectivity and hiding the subjectivity of the archivists.[11] In the late 1990s and early 2000s, there were calls for archive constructs to be redesigned to recognise that records are dynamic.[12] Understanding that any descriptive standards inevitably prioritise some voices over others, Duff and Harris have urged more liberatory approaches that allow multiple perspectives.[13] Meanwhile, Millar has argued that archival description can be a tool for institutional and social accountability.[14] These arguments have presented the difficulty that it is impossible for archival description to encompass all possible perspectives. Yeo has embraced the inevitable tensions and complexity that have developed, saying that definitive descriptions are impossible, and descriptions should be "always beta," always subject to change and improvement.[15] In this light, this chapter will not presume there is a single, perfect solution to access for environmental research as researchers are likely to view environmental records through very different paradigms from archivists.

There has been extensive work on countering potential gaps or biases within archives, particularly where social inequalities and historical injustices may be reinforced by the archive. A range of approaches have emerged. Some have challenged the ostensibly objective "view from nowhere" of archivists and archive processes and encouraged

[9] Jennifer Meehan, "Making the Leap from Parts to Whole: Evidence and Inference in Archival Arrangement," *The American Archivist*, vol. 72, 2009.
[10] Elizabeth Yakel, "Archival Representation," *Archival Science* 3, no. 1 (2003): 1–25; Francis X. Blouin, "Archivists, Mediation, and Constructs of Social Memory," *Archival Issues* 24, no. 2 (1999): 101–12; Richard H. Schein, "Digging in Your Own Backyard," *Archivaria* 61, no. 1 (2006): 91–104; Schwartz, "'Having New Eyes': Spaces of Archives, Landscapes of Power."
[11] Michelle Light and Tom Hyry, "Colophons and Annotations: New Directions for the Finding Aid," *The American Archivist* 65, no. 2 (2002): 216–30.
[12] Peter Horsman, "Archival Description from a Distant View," in *Working With Knowledge*, 1998, 1–11, http://www.asap.unimelb.edu.au/asa/stama/conf/WWKHorsman.htm.
[13] Wendy M Duff and Verne Harris, "Stories and Names: Archival Description as Narrating Records and Constructing Meanings," *Archival Science*, vol. 2 (Kluwer academic Publishers, 2002).
[14] Laura Millar, "An Obligation of Trust: Speculations on Accountability and Description," *The American Archivist* 69, no. 1 (2006): 60–78.
[15] Geoffrey Yeo, "Continuing Debates about Description," in *Currents of Archival Thinking, 2nd Edition*, 2017, 115.

archivists from oppressed communities to embrace their positionality.[16] Other grassroots approaches include the numerous and diverse examples of community archives (often closely linked to activism and social justice),[17] which have been described as crucial to countering the "symbolic annihilation" of marginalised groups.[18] Archivists have also needed to contend with the practical difficulties when existing material and description reinforces prejudices; Chilcott has developed a "good, better, best" approach to handling racially offensive language in archive material to create more empathetic and sensitive description, while recognising funding and resource issues that might make implementation of best practice challenging for many repositories. [19] These guidelines draw from existing protocols in the US[20] and Australia[21] for archives of indigenous peoples. Buchanan and Bastian have discussed the role archival material can have for activism, arguing that archive material can empower activists to develop narratives for change, points which may contain valuable lessons for environmental and climate activists.[22]

There are social implications to environmental issues,[23] however the identity issues of racial, gender and LGBTQ+ records in archives do not usually apply to the environment. Speaking both on research using materials related to transgender people, and as a transgender researcher, Rawson discusses how spaces can be inaccessible or off-putting to transgender researchers because of environmental cues – such as bathrooms or language

[16] Michelle Caswell, "Dusting for Fingerprints: Introducing Feminist Standpoint Appraisal," *Journal of Critical Library and Information Studies* 3, no. 1 (2019): 2–36.
[17] Alex H Poole, "The Information Work of Community Archives: A Systematic Literature Review," *Journal of Documentation* 76, no. 3 (2020): 657–87.
[18] Michelle Caswell, "Seeing Yourself in History: Community Archives and the Fight Against Symbolic Annihilation," *The Public Historian* 36, no. 4 (2014): 26–37.
[19] Chilcott, "Towards Protocols for Describing Racially Offensive Language in UK Public Archives."
[20] Protocols for Native American Archival Materials, "Protocols for Native American Archival Materials," accessed August 18, 2020, http://www2.nau.edu/libnap-p/protocols.html; Frank Boles, David George-Shongo, and Christine Weideman, "Report: Task Force to Review Protocols for Native American Archival Materials," 2008, http://files.archivists.org/governance/taskforces/0208-NativeAmProtocols-IIIA.pdf.
[21] New South Wales State Records Authority, "Protocols for Staff Working with Indigenous People," 2016, www.records.nsw.gov.au; Australian Society of Archivists, "Policy Statement on Archival Services and Aboriginal and Torres Strait Islander Peoples," 1997, https://www.archivists.org.au/documents/item/32.
[22] Alexandrina Buchanan and Michelle Bastian, "Activating the Archive: Rethinking the Role of Traditional Archives for Local Activist Projects," *Archival Science* 15, no. 4 (2015): 429–51.
[23] David N. Pellow, "Environmental Inequality Formation," *American Behavioural Scientist* 43, no. 4 (2000): 581–601.

used.[24] However, a researcher is unlikely to encounter stigma or social barriers to environmental research in most situations. Rawson also distinguishes between physical, social and intellectual access to archives.[25] The access issues for environmental history are primarily intellectual, as paradigm blindness in archive practices can hide the potential of records for environmental research just as LGBTQ+ identities are often hidden in archives.

A more comparable example for examining the environmental archival gap is the *Sustaining Time* project, during which Bastian and Buchanan found that little archive material was devoted explicitly to temporal issues, but time was implicit in almost every document.[26] Similarly, the case study of this thesis has made use of source material in which environment is not the subject of the record, as is the case with the majority of pre-instrumental material used to examine the environment. Thus, one of the access issues for environmental research is that the record creators did not set out to record the environment, although as Jenkinson observed, records are rarely created for researchers:

> […] concerning the Research ends which Archives may be made to serve is that with one partial exception these shall not be the purposes which were contemplated by the people by whom the Archives were drawn up and preserved.[27]

Thus, the records were neither created nor have they been described by archivists with environmental information in mind, and the relevant data can be hidden or obscured and challenging to locate. As a result, there are important questions to ask about how researchers find this hidden material.

In addition to the difficulty of representing multiple perspectives and countering gaps in the archive, archivists have needed to manage large (and increasing) backlogs.[28] In 2005,

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[24] K.J. Rawson, "View of Accessing Transgender // Desiring Queer(Er?) Archival Logics," *Archivaria* 68 (2009): 123–40, https://archivaria.ca/index.php/archivaria/article/view/13234/14552.
[25] Rawson, 126.
[26] Bastian, Buchanan, and Southern, "Sustaining Time Exploring the Emergent Times of Alternative Economies Final Project Report."
[27] Hilary Jenkinson, *A Manual of Archive Administration* (London: Percy Lund, Humphries & Co Ltd, 1937), 12.
[28] Mark A Greene and Dennis Meissner, "More Product, Less Process: Revamping Traditional Archival Processing," *The American Archivist* 68, no. 2 (2005): 210; Janice Tullock and Alexandra Cave, "Logjam: An Audit of Uncatalogued Collections in the North West," 2003, https://www.nationalarchives.gov.uk/documents/archives/Logjamfullreport.pdf.

Greene and Meissner proposed "More Product, Less Process" (MPLP), the principle that archivists need not and should not focus on describing and preserving every item to a high level of detail, but should prioritise access.[29] Although there have been concerns raised about MPLP, such as whether privacy can be adequately protected within records,[30] there are also many arguments and case studies in favour of MPLP.[31] Others have seen online access as a starting point, not an end point for processing, with the MPLP as a method of identifying material for detailed processing[32] and maximal processing as proposed by Cox allowing for all levels of description to be dynamic and changing.[33] In order for these approaches to be effective in improving access, (as Cox recognises) they need to be effective in meeting the needs and search behaviour of researchers.

There have been many studies of the information behaviour of researchers in different contexts, and a common theme is that researchers prefer easy, lower-effort access and that information behaviour often correlates to membership of a domain (occupation, academic discipline, role, etc).[34] Until the 1990s, the focus of the majority of research on information behaviour in information science focused on STEM topics, with the humanities only receiving attention relatively recently.[35] There are a range of models of information behaviour, ranging from descriptive models which describe different stages of the research process, through to complex models (non-linear and multidirectional).[36] Cultural dimension theory has been applied to internet search behaviour, showing only a weak connection

[29] Greene and Meissner, "More Product, Less Process: Revamping Traditional Archival Processing"; Dennis Meissner and Mark A. Greene, "More Application While Less Appreciation: The Adopters and Antagonists of MPLP," *Journal of Archival Organization* 8, no. 3–4 (July 2010): 174–226.
[30] Matt Gorzalski, "Minimal Processing: Its Context and Influence in the Archival Community," *Journal of Archival Organization* 6, no. 3 (2008): 186–200.
[31] Donna E. McCrea, "Getting More for Less: Testing a New Processing Model at the University of Montana," *The American Archivist* 69 (2006): 284–90; Philadelphia Area Consortium of Special Collections Libraries (PACSCL), "The PACSCL Hidden Collections Processing Project," accessed March 10, 2021, https://pacscl.org/the-pacscl-hidden-collections-processing-project/; Christine Weideman, "Accessioning as Processing," *The American Archivist* 69, no. 2 (2006): 274–83.
[32] "Tweezers and Shovels : On the Use of MPLP – On Archiving Schapiro," 2009, https://blogs.cul.columbia.edu/schapiro/2009/03/09/more-product-less-process-mplp/.
[33] Robert S. Cox, "Maximal Processing, or, Archivist on a Pale Horse," *Journal of Archival Organization* 8, no. 2 (May 28, 2010): 134–48.
[34] David Bawden and Lyn Robinson, "Information Behaviour," in *Introduction to Information Science*, ed. David Bawden and Lyn Robinson (London: Facet, 2012), 187–210.
[35] Bawden and Robinson, 190–91.
[36] For a summary: Bawden and Robinson, "Information Behaviour."

between cultural dimensions and online search behaviour.[37] Peng Qu et al have found that while task type and topic familiarity might influence certain search behaviours (completion time and number of queries), it does not influence habitual behaviours such as search entrance, suggesting researchers may stick to habitual familiar routes for information seeking.[38] Others have focused on generational differences. For example, Arthur Taylor has examined the online search behaviour of millennials, who have come of age with a profusion of technology,[39] while the information literacy of history students was studied in the same year by Pinto, and both found a need for improvements in information literacy and education among the groups in question.[40] The overall impression is that existing habits and professional domain may be the biggest predictors of an individual's search behaviour, and that young and emerging researchers may need support and education in information behaviour.

When launching Discovery, The National Archives recognised that there is no such thing as an "average" archive user so used persona-based design based on users identified as Rambler (Beginner), Explorer (Intermediate) or Tracker (Advanced).[41] In this model, academic researchers are usually expected to be historians and experienced archive users, and, with some exceptions, most archive user studies have focused on historians as the "traditional" users of archives.[42] There are several ways of studying the search behaviour of archive users. Surveys and interviews with a convenience sample of archive users have

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[37] Anett Kralisch and Bettina Berendt, "Cultural Determinants of Search Behaviour on Websites," in *Proceedings of the IWIPS 2004 Conference on Culture, Trust, and Design Innovation* (Vancouver, Canada, 2004).

[38] Peng Qu, Chang Liu, and Maosheng Lai, "The Effect of Task Type and Topic Familiarity on Information Search Behaviors," *IIiX '10: Proceedings of the Third Symposium on Information Interaction in Context*, 2010, 371–376, http://www.baidu.com.

[39] Arthur Taylor, "A Study of the Information Search Behaviour of the Millennial Generation," *Information Research* 17, no. 1 (2012).

[40] Maria Pinto, "Information Literacy Perceptions and Behaviour among History Students," *Aslib Proceedings: New Information Perspectives* 64, no. 3 (2012): 304–27.

[41] Phillips and Donald, "The National Archives - Design through Research: The Concepts behind Discovery - The National Archives Blog" (The National Archives, 2012), https://blog.nationalarchives.gov.uk/design-through-research-the-concepts-behind-discovery/.

[42] Examples include: D. L. Beattie, "An Archival User Study. Researchers in the Field of Womens' History," *Archivaria* 29 (1989): 33–55; Barbara C Orbach, "The View From the Researcher's Desk: Historians' Perceptions of Research and Repositories," *American Archivist* 54, no. 1 (1991): 28–43; Wendy M Duff and Catherine A Johnson, "Accidentally Found on Purpose: Information-Seeking Behavior of Historians in Archives," *The Library Quarterly: Information, Community, Policy* 72, no. 4 (2002): 472–96.

been used by Wendy Duff and Catherine Johnson as well as Barbara Orbach.[43] Postal questionnaires have been used to gain a broader understanding of Canadian archive users.[44] A self-reflective approach was even taken by Jasmijn Van Gorp, by logging, videotaping and sound-recording her experience searching in a digital television archive.[45] In 2002, Duff and Johnson identified four types of research behaviours: orientation within an archive, searching for known material, building contextual knowledge and identifying relevant material.[46] In a later study, Duff et al found that historians tend to prefer "completeness," and therefore partial digitisation is helpful only if there is explicit explanation of what has or has not been digitised, and why.[47] They also found that historians want better and faster access to finding aids, echoing the finding of Greene and Meissner when propounding More Product Less Process.[48]

Studies with American researchers have found a range of behaviours, including developing relationships or consulting with archivists in order to benefit from their knowledge and systematic building of contextual knowledge.[49] Nevertheless, studies on American archive users, such as those by Johnson and Duff would not be directly applicable to archives in the United Kingdom, even if they had consulted environmental researchers. The research interface in the US is different to the UK, as usually in the US there is a reference interview prior to an archive visit. In the UK any consultation is often via correspondence, and it is often possible to visit an archive in the UK without ever speaking directly to an archivist.

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[43] Catherine A Johnson and Wendy M Duff, "Chatting Up the Archivist: Social Capital and the Archival Researcher," *The American Archivist* 68, no. 1 (2005): 113; Duff and Johnson, "Accidentally Found on Purpose: Information-Seeking Behavior of Historians in Archives"; Orbach, "The View From the Researcher's Desk: Historians' Perceptions of Research and Repositories."

[44] Wendy Duff, Barbara Craig, and Joan Cherry, "Finding and Using Archival Resources: A Cross-Canada Survey of Historians Studying Canadian History," *Archivaria* 58, no. 1 (2004): 51–80.

[45] Jasmijn Van Gorp, "Looking for What You Are Looking For," *VIEW Journal of European Television History and Culture* 2, no. 3 (June 30, 2013): 45.

[46] Duff and Johnson, "Accidentally Found on Purpose: Information-Seeking Behavior of Historians in Archives," 492.

[47] Duff, Craig, and Cherry, "Finding and Using Archival Resources: A Cross-Canada Survey of Historians Studying Canadian History," 71.

[48] Greene and Meissner, "More Product, Less Process: Revamping Traditional Archival Processing," 235.

[49] Johnson and Duff, "Chatting Up the Archivist: Social Capital and the Archival Researcher"; Duff, Craig, and Cherry, "Finding and Using Archival Resources: A Cross-Canada Survey of Historians Studying Canadian History"; Orbach, "The View From the Researcher's Desk: Historians' Perceptions of Research and Repositories"; Duff and Johnson, "Accidentally Found on Purpose: Information-Seeking Behavior of Historians in Archives."

Examinations of digital archives described processes of learning how systems work and beginning with broader keyword searches that are then reframed and narrowed.[50] Common themes in many studies have been historians seeking to contextualise and have completeness,[51] as well as searches moving from the broad to the specific. Recommendations for improvement of archive services have included research or subject guides and training of both archivists and researchers.[52] Orbach's study found a lack of understanding among historians of the constraints archivists work under, and encourages means for repositories and greater researcher independence (and move away from the reference interview), and better training in archival literacy.[53] However, there has been little research into supporting specific topics of research, other than the work on identity records discussed above.

There is therefore a gap in archival theory, with little that examines how to enable access for a multidisciplinary field of research such as the environment. Many environmental researchers are experienced archive users who regularly use original documents in their research. However, others are professional researchers but not experienced archive users. Therefore, they are likely to have a great deal of subject knowledge, but less archival literacy. As a result, environmental researchers are potentially very diverse in experience with archives. Drawing on these challenges, this chapter will examine the difficulties with using archives for environmental research. Personal experience collaborating with the Staffordshire Record Office on the *Historic Flooding and Drought* project will be used to discuss how material was identified for research on sixteenth- to eighteenth-century flooding. The relatively unusual privileges afforded by working in collaboration with the archive, rather than as an archive user, will then be contextualised in relation to the experiences of other researchers in water histories and other repositories.

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[50] Van Gorp, "Looking for What You Are Looking For"; Jaspreet Singh, Wolfgang Nejdl, and Avishek Anand, "History by Diversity: Helping Historians Search News Archives," *CHIIR '16: Proceedings of the 2016 ACM on Conference on Human Information Interaction and Retrieval*, 2016, 183–92.
[51] Duff and Johnson, "Accidentally Found on Purpose: Information-Seeking Behavior of Historians in Archives"; Johnson and Duff, "Chatting Up the Archivist: Social Capital and the Archival Researcher"; Hea Lim Rhee, "Modelling Historians' Information-Seeking Behaviour with an Interdisciplinary and Comparative Approach," *Information Rsearch* 17, no. 4 (2012).
[52] Beattie, "An Archival User Study. Researchers in the Field of Womens' History"; Orbach, "The View From the Researcher's Desk: Historians' Perceptions of Research and Repositories."
[53] Orbach, "The View From the Researcher's Desk: Historians' Perceptions of Research and Repositories," 41.

As the methods used to find material for *Flooding and Drought* were not typical, it was necessary to obtain data about other repositories and researchers. To achieve this, two surveys were conducted: one of researchers who have examined water histories asking about their experiences as archive users, the other of archivists asking about environmental information and its users in their repositories. The responses from each represent a small sample but do provide comparisons for different repositories and search behaviours.

The first survey was circulated among environmental historians, historical geographers, and other relevant researchers via email. This survey aimed to examine the behaviours used to find archive material for environmental research and included questions on their disciplinary identity, types of material they use, search terms and methods they use to find materials, and problems they encounter. To ensure the data was comparable with the case study for this thesis, this was limited to researchers who have examined water histories. Several were approached directly as they were already known to me and others were identified by recommendation of those I contacted, resulting in responses from eleven researchers, a number comparable to the convenience samples used by Duff and Johnson.[54] However, the behaviour found in UK researchers is likely to be different from that found in US studies, due to differences in how researchers access archives.

For the survey on archive support for environmental history (Appendix III), participants were recruited via the Archives NRA JISCMail (the main listserv for the archival community). The survey included questions about what material the archivists were aware of in their collections, whether these records are catalogued and indexed, how researchers might identify relevant material and whether the archivists were aware of queries about environmental topics. This aimed to achieve three things: firstly, to gain an impression of the potential of archives in the UK for environmental research; secondly, to assess how aware of this potential and of environmental research archivist are; and thirdly, to understand how records might be accessed by researchers and whether potential solutions are currently being implemented. In total, staff from ten repositories responded by completing a questionnaire, and several others emailed with useful information, such as suggestions of resources to consult (Table 5.1), and additional searching found the

[54] Johnson and Duff, "Chatting Up the Archivist: Social Capital and the Archival Researcher"; Duff and Johnson, "Accidentally Found on Purpose: Information-Seeking Behavior of Historians in Archives."

Yorkshire Wildlife Trust Project at the Borthwick Institute of Archives.[55] As this survey was undertaken during the COVID-19 lockdown in spring 2020, not all the archivists reached will have had full access to their repositories or catalogues. Therefore, many responses may be based on their own experience and what resources they did have available, indeed several responses apologised for not being able to search as freely as they normally could. This may have affected the outcome, however responses to questions such as "Do you know of any material in your archive that might be relevant to environmental research?" may better reflect the archivist's personal awareness of the potential of their archive than if they did have full access.

Table 5.1: Repositories from which a member of staff responded

Survey Response	**Email Contact**
Anglesey Archives Bedfordshire Archives & Records Service Bath Record Office East Riding Archives and Local Studies Expatriate Archive Centre King's College Cambridge National Monuments Record of Wales University of East Anglia Archives The Royal Society University of Exeter Special Collections	The British Library Institution of Civil Engineers The Borthwick Institute for Archives Suffolk Archives London Metropolitan Archives The University of Bath
Suggested resources and projects	
La memoria nel fango: La Soprintendenza Archivistica per la Toscana a l'alluvione del 1966	http://www.sa-toscana.beniculturali.it/alluvione/index.php?id=163
Suffolk Archives Orlando Whistlecraft, Weather Prophet of Thwaite	https://www.suffolkarchives.co.uk/people/suffolk-men/orlando-whistlecraft-weather-prophet-of-thwaite/
University of Exeter Special Collections Common Ground archive: 'Confluence' and 'Rhynes, Rivers and Running Brooks'	http://specialcollections.exeter.ac.uk/2019/08/29/cataloguing-the-common-ground-archive-confluence-and-rhynes-rivers-and-running-brooks/
Bath Record Office Building a Healthier City - funded by the Wellcome Trust Mobilising Britain's historical flood information in support of contemporary flood risk assessments	https://www.batharchives.co.uk/building-healthier-city-funded-wellcome-trust https://www.bath.ac.uk/projects/mobilising-britains-historical-flood-information-in-support-of-contemporary-flood-risk-assessments/
The University of Bath David Edwin Coombe Collection	https://www.bath.ac.uk/corporate-information/david-edwin-coombe-collection/
Coflein The online catalogue of archaeology, buildings, industrial and maritime heritage in Wales	https://www.coflein.gov.uk/

[55] Borthwick Institute for Archives, "YWT Project," accessed August 20, 2020, https://www.york.ac.uk/borthwick/projects/ywt-project/.

5.1 The Staffordshire Record Office

The Staffordshire Record Office possesses a large amount of legacy data from prior to both the creation of the online catalogue and the adoption of the General International Standard for Archival Description (ISAD(G)), first published in 1994,[56] which has not yet been completely updated. Although there is variation in cataloguing standards used, most description in the Staffordshire Record Office adheres to the principle that archival cataloguing should represent the provenance and original context of the records. The paper catalogue is available to archive users in the reading room, alongside reference resources for users to consult. An online catalogue, *Gateway to the Past* was launched in 2002 and more than ninety per cent of the paper catalogue has since been made available online. Cataloguing is done using Calm ALM, management software produced by Axiell for archives, libraries and museums based on the database management software DScribe and designed to allow cataloguing to international professional standards, and the Staffordshire Record Office catalogue in Calm is configured to enable cataloguing in line with ISAD (G).[57] When importing data from the paper catalogue, the record office prioritised access and for the most part kept the existing data rather than trying to improve it. Since then, work on catalogue improvement is ongoing by both the archivists and volunteer groups. Because of the practical difficulties in updating catalogues like this, it can be frustrating for users who do not always understand the workings and practicalities of archives.

At present, cataloguing practices and standards do not lend themselves to easily locating records that might be useful for environmental research. ISAD (G) is an internationally recognised and commonly used descriptive standard published by the International Council on Archives, used by the Staffordshire Record Office and all of the repositories that responded to a survey discussed later in this chapter.[58] ISAD (G) outlines twenty-six elements of description, six of which are considered mandatory: reference code; title; creator; date(s); extent of the unit of description; and level of description.[59] This and the

[56] International Council on Archives, "ISAD(G): General International Standard Archival Description," 2000.
[57] Axiell, "Calm ALM for Archives," accessed August 25, 2020, http://www.dswebhosting.info/documents/Manuals/ALM/V11/archive/archive_menu.htm.
[58] International Council on Archives, "ISAD(G): General International Standard Archival Description."
[59] International Council on Archives, 9.

extended list of descriptive elements prioritise the human activity that the records document. The example description provided for the fonds of the Canadian Department of Railways and Canals details the administrative structure of the department (in line with prioritising the recordness of the fonds).[60] Although this includes the names of canals and navigation systems, this is as a result of description of the remit of the department, rather than description of the environment, in line with the traditional archival focus on provenance and the documentation of the activity of the record creator described by Bearman.[61] It might seem likely that records of the Department of Railways and Canals would include information either about or relevant to the environment, but the description would not indicate whether the records are useful unless any are explicitly about the environment and this is indicated in their title (a mandatory element).

The lease for a paper mill discussed in Chapter 3 (3.2.2 The parcel: water included in a tenancy) is described in the Staffordshire Record Office catalogue in line with traditional cataloguing conventions.[62] The description indicates what the records are, but not their content and gives no indication of the flood defences that are described. The parties involved are mentioned, as is the mill and river as the "subject" of the lease, however contextual information would be needed to indicate that this specific record could be useful, such as awareness of the 1795 flooding and its potential relevance to the rebuilding mentioned. Many of the records consulted for Chapters 2-4, particularly in Chapter 3 originated in estate collections. A framework for estates records was created by White et al in 1992, with allowance for differences in management between estates and preserving original order.[63] Although some of the categories in the scheme have clear links to the environment (e.g. 5.15 records relating to forests, coppices, plantations and timber), it is record type and administrative activity which is the basis for the framework. As a result, both the descriptive fields included in a catalogue and its structure can obscure which records are (or are not) useful for environmental research.

[60] International Council on Archives, "ISAD(G): General International Standard Archival Description."
[61] International Council on Archives, 40–45; Bearman, "Documenting Documentation."
[62] SRO D952/2/2/2; see: Margaret Procter and Michael Cook, *Manual of Archival Description : Third Edition* (Aldershot: Gower, 2000).
[63] White et al., "The Arrangement of Estate Records."

Located At	Staffordshire Record Office
Level	Item
Alt Ref No	D952/2/2/2
Title	Leases of an ancient water mill, usually called the Old Paper Mill, situated on the Colebrook, Tyrley, with plan and elevation of mill.
Date	1795-1816
Description	1) Thomas Dicken to Edward Charles for 21 years. 1795 2) Also plan and elevation of mill rebuilt by Charles as a condition of the lease, inc.a section of the river channel. 1795 Scale: 1 inch to 8 feet. 3) Thomas Twemlow to Edward Charles for 12 years (renewal) 1816
Extent	3 documents

Figure 5.1: Catalogue description for the lease of a paper mill

5.1.1 Indexing

Although archival description traditionally prioritises recordness rather than subject content, indexing with subject headings can provide a means of indicating subjects using consistent terminology while still describing records using the language of the record. Indexing is not universally used, and Bearman has questioned the effectiveness of authority control for subject headings.[64] However others have argued that authority control enables the creation of intellectual order and that free-text searching shifts the burden of work from the archivist to the researcher.[65] This is unhelpful for less experienced archive users and for research requiring specific details from a large volume of records (as is the case for many environmental researchers), as it greatly increases the magnitude of research tasks. The move from card indexes to index terms attached to entries in digital catalogues has solved some issues with index terms by resolving technological limitations.[66] The Staffordshire Record Office does index their online catalogue, using the UK Archival

[64] Bearman, "Authority Control Issues and Prospects."
[65] Cynthia J. Durance, "Authority Control: Beyond a Bowl of Alphabet Soup," *Archivaria* 35 (1992); Candida Fenton, "Use of Controlled Vocabulary and Thesauri in UK Online Finding Aids," *Journal of the Society of Archivists* 31, no. 2 (2010): 187–205.
[66] Fenton, "Use of Controlled Vocabulary and Thesauri in UK Online Finding Aids."

Thesaurus (based on the UNESCO thesaurus) as the basis for their thesaurus.[67] However, they have not been able to fully index the material in their online catalogue.

Even when a catalogue is searchable using an index, this does not guarantee that environmental subjects will be findable (particularly if indexing is only partial). The UK Archival Thesaurus (UKAT) was created for archives in the United Kingdom based on the UNESCO thesaurus because many UK archives and projects had already adopted UNESCO for indexing purposes, including The Archives Hub.[68] In recognition of the lack of depth often available with UNESCO terminology, it has also been possible for professionals to contribute terms, although UKAT is no longer being actively developed. However, this means there are many absences from the Thesaurus, such as "slitting mills" (of which there were several found while examining leases) although there are several other narrower terms for "mills" specified by UKAT:

- Corn mills
- Flour mills
- Fulling mills
- Gunpowder mills
- Horse mills
- Leather mills
- Oil mills
- Paper mills
- Roller mills

For flooding, the preferred UKAT term is "floods," and only specifies "flooding," "flooding disasters" and "water damage" as non-preferred terms and no other variant terms for flooding (Table 5.2). If indexing is used, one solution to issues with the thesaurus is to expand the list of non-preferred terms, which could include synonyms.

However, there are other issues with the thesaurus which makes positioning environmental research within it challenging. The UNESCO thesaurus is polyhierarchical for countries, allowing a country to have multiple broader terms (for example, the broader terms for the UK are "EEC countries," "European Union," "OECD countries" and "Western Europe").[69] However, this is not the case for subject headings so only one broader term is possible for

[67] "UKAT - UK Archival Thesaurus | Home," accessed July 27, 2020, https://ukat.aim25.com/.
[68] "UKAT - UK Archival Thesaurus | Home."
[69] UNESCO, "Introduction : Unesco Thesaurus," accessed November 2, 2020, http://vocabularies.unesco.org/documents/thesaurusintroeng.pdf.

an index term (UKAT is polyhierarchical but "floods" is only positioned within "natural disasters"). The positioning of "floods" within science categorises flooding as a scientific rather than social event, and as a natural disaster (presuming therefore that flooding is both natural and disastrous). One of the arguments of this thesis is that such categorisation is problematic and represents a form of 'paradigm blindness.' In the previous three chapters, flooding was analysed as a social problem, that was the subject of disputes and issues within or between communities. It also was not always a natural disaster, and my analysis was concerned more with the mundane than with extreme events, including many narratives of human culpability for flooding. As a contrast, the Getty Art & Architecture includes "floods" under "natural events," which does not assume flooding is always a disaster (although still assumes it is natural).[70]

Any means of categorising information is going require drawing distinctions, and from an interdisciplinary point of view these distinctions may seem arbitrary. There is nothing wrong with viewing flooding as a scientific event or a natural disaster, as flooding is studied scientifically and may be both disastrous and caused by natural processes, but in the context of this study this view of flooding is not helpful. It may be that as archives are increasingly used for environmental research in an interdisciplinary environment, the rigid structure presented by indexing is not a sufficient solution.

[70] Getty Research Institute, "Art & Architecture Thesaurus," accessed August 18, 2020, http://www.getty.edu/research/tools/vocabularies/aat/.

Table 5.2: Position of "environment," "floods" and "waterways" in the UK Archival Thesaurus

2. Science
↳ 2.55 Environmental Sciences and Engineering
↳ Environment
Used for:
Environmental history
↳ Natural environment
↳ Aquatic environment
↳ Marine environment
↳ Natural habitats
↳ Terrestrial environment
↳ 2.60 Pollution, Disasters and Safety
↳ Disasters (by type)
↳ Natural Disasters
↳ Floods
Used for:
Flooding
Flooding Disasters
Water Damage
Related terms:
Flood control
Flood damage
Hydrometeorology
Mining disasters
Precipitation
Rivers
6. Politics, Law and Economics
↳ 6.60 Equipment and Facilities
↳ Transport Infrastructure
↳ Waterways
Used for:
Water courses
Related terms:
Weirs
↳ Canals
↳ Inland waterways
↳ Locks
↳ Man-made watercourses
↳ Navigable rivers

However, many of these issues only matter to the user if they affect the search functionality of the catalogue. If an archive user cannot see the hierarchy of the index, and the hierarchy does not affect their search, then it does not matter. Archive users at the Staffordshire Record Office do not search in Calm, they access the catalogue via a web-based interface, and CalmView is the interface for *Gateway to the Past*. CalmView can be configured in different ways, one possibility is to have a subject field in the advanced search

page and/or a subject browser, which allows the user to browse index terms.[71] As a result, it is possible for users to search using the subject index if this feature is enabled. With these absent, the user has no way of directly searching on authority records or index terms.[72] The Staffordshire Record Office does not have these features as part of *Gateway to the Past* (Figure 5.2). Therefore, records are often only possible to find through a free text search, and variations in language of description means that a user might need to try multiple terms to find the desired material.

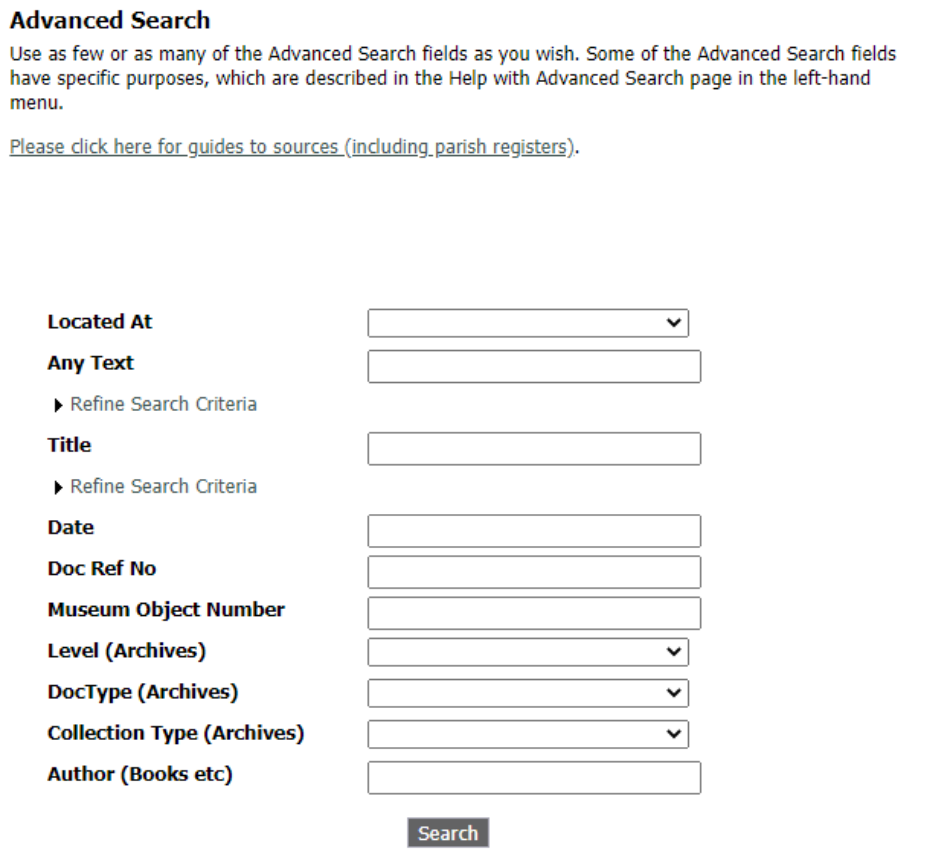


Figure 5.2: Advanced Search options for *Gateway to the Past*

[71] Axiell, "CalmView Guide," accessed August 25, 2020, http://www.dswebhosting.info/Documents/Manuals/Web/CalmView/V30/index.htm; Axiell, "Calm ALM for Archives."

[72] An authority record is typically a standardised or authorised form of a name alongside contextual information. They are used to control access points, and so improve access for researchers.

5.2 Historic Flooding and Drought in Staffordshire

As discussed previously, searching the catalogue did not adequately locate material for the research in Chapters 2-4. Prior experience with published sources had informed some of the research, while less conventional means of searching the archive catalogue were used for others. Usually, the best way of identifying manor court records for research would be to use the Manorial Documents Register,[73] however the register only indicates that the records exist, there is nothing to indicate whether they have environmental relevance. A researcher would need to be aware of the functions of the manor court and their potential usefulness, which may come from prior experience with manor courts or from work such as that by King.[74] The same is true of the minute books held by The National Archives for the Oxford Assize circuit (which included Berkshire, Gloucestershire, Herefordshire, Monmouthshire, Oxfordshire, Shropshire, Staffordshire and Worcestershire).[75] The use of court records for this study was based on previous experience using court records for water histories, having previously found material related to water in published manor court records for Acomb, Manchester and Prescot, and Assize orders from the Western Circuit.[76] The accessibility of these records did not come solely from their existence as published volumes in a library or online. J. S. Cockburn's edition of the *Western Circuit Assize Orders* is indexed with both place names and subject headings. Nevertheless, environmental subjects do not feature among the subjects, which are based on the functions of the court, however subjects such as "Bridges, inspection and repair of," and "Water-courses, obstruction of," were still useful headings. In this case, existing experience, rather than a catalogue search, lead to potential material in the Staffordshire Record Office.

[73] The National Archives, "Manorial Documents Register," accessed July 21, 2020, https://discovery.nationalarchives.gov.uk/manor-search.
[74] King, "How High Is Too High? Disposing of Dung in Seventeenth-Century Prescot."
[75] TNA ASSI 2 1-15.
[76] Harold Richardson, ed., *Court Rolls of the Manor of Acomb, Vol.1*, vol. 131 (Wakefield: The West Yorkshire Printing Company Ltd., 1969); John Harland, ed., *A Volume of Court Leet Records of the Manor of Manchester in the Sixteenth Century* (The Chetham Society, 1864); F. A. Bailey, ed., *A Selection from the Prescot Court Leet and Other Records, 1447-1600*, vol. 89 (The Record Society of Lancashire and Cheshire, 1937); Walter J. King, ed., *The Court Records of Prescot, 1640-1649*, vol. 143 (Bristol: The Record Society of Lancashire and Cheshire, 2008); Cockburn, *Western Circuit Assize Orders 1629-1648 : A Calendar*.

In contrast, the Quarter Sessions records held by the Staffordshire Record Office are far easier to search for relevant material. The work that a group of volunteers have done on the Quarter Sessions has provided enough detail that it could be searched for relevant terms (such as "flood" or "bridge") and a large amount of data was gathered from the catalogue itself. The most time-consuming part of working with historical data is usually the data capture. Digital catalogues provide a mostly unrecognised resource for research when a little ingenuity is applied. This is beginning to be recognised by archivists, and Richard Dunley demonstrates on The National Archives blog that it is possible to take advantage of the existing, structured data of The National Archives catalogue, but that it is unusual for the archive catalogue itself to be recognised as a data source.[77] As I was able to download the catalogue information from Calm and search it both using a text search and by reading a physical copy of the records with greater ease than would be afforded by navigating the catalogue hierarchy. In other words, I was able to create my own finding aid, although this is not the same as the user contributions to description described by Yeo,[78] as it used existing catalogue data. An obvious issue with this is the reliability of the existing archive catalogue and the next step would involve user-based catalogue enhancement. Although over ninety per cent of the paper catalogue for the Staffordshire Record Office has been put online, work is still ongoing and much of the catalogue data was captured prior to current cataloguing standards. Thus, the catalogue is not always consistent enough to be used as data unless it is improved, and this was only possible with the Quarter Sessions due to the work of a volunteer group over several years.

As part of collaboration with the Staffordshire Record Office, the associated PhD students were given more privileged access than most archive users to allow effective running of the volunteer project. This included direct access to the archive strong room and dedicated storage space for the project, allowing access to a greater volume of material at once than the limits normally applied to archive users. We were also able to access more guidance from archive staff than most users might, due to working alongside archive staff for a long period of time. Staff computer accounts were created, giving us access to local authority computer support and the ability to search and alter the archive catalogue using Calm

[77] Richard Dunley, "Catalogue as Data: The Basics," The National Archives blog (The National Archives, 2018), http://blog.nationalarchives.gov.uk/blog/catalogue-data-basics/.
[78] Yeo, "Continuing Debates about Description," 114–15.

(rather than searching CalmView, as archive users would normally). Access via Calm made navigating the catalogue easier and enabled large quantities of catalogue data to be downloaded in ways that are not possible with normal catalogue access. Without this access, many of the methods used to identify material for this research would not have been viable, such as creating my own finding aid for the Quarter Sessions records.

Ian Mortimer makes the case for discriminating between archive users and suggests that "research officers" (usually academic researchers) should be granted a greater ease of access than recreational users in order to better facilitate the kinds of research academic historians usually require.[79] One of the key points raised by Mortimer is the volume of material a researcher may consult at any one time, which slows research when very specific information is needed from a large number of records.[80] Stacy Gee has challenged the distinction between "research officers" and "recreational" users, giving several examples of users who would not fit either category and illustrating why prioritising along as sharp a line as Mortimer's may cause issues, including for local history groups and local campaigning.[81] The researchers who have been surveyed here firmly fit Mortimer's definition of a research officer, so in this context the distinction between the two approaches is negligible. However, the environment is of interest beyond academic research, and there are many uses of environmental data that might blur this distinction (such as activism). Nevertheless, the point made by Mortimer about volumes of material is valid for the research undertaken for this project, in which hundreds items were consulted (including over 200 leases and title deeds and two centuries of Quarter Sessions rolls), most of which only needed to be examined for short periods of time. The Staffordshire Record Office only allows three items to be pre-ordered in advance of a visit, a restriction which would have severely limited the pace of the project.

The *Historic Flooding and Drought* project did enjoy the level of access that prevented many access issues. However, this was exceptional in ways other than Mortimer envisioned and would not be possible or practical for all academic researchers. Mortimer does not

[79] Ian Mortimer, "Discriminating Between Readers: The Case for a Policy of Flexibility," *Journal of the Society of Archivists* 23, no. 1 (2002): 59–67.
[80] Mortimer, 61.
[81] Stacey Gee, "A Standard Service for All? The Case for Flexible Attitude," *Journal of the Society of Archivists* 23, no. 2 (October 2002): 233–38.

discuss this in relation to volunteer projects, in which the volunteers benefit from the privileges held by the project coordinator, or in relation to collaborations between institutions. Most academic researchers, while being experts in their fields, are not archivists and without specific training could inadvertently pose a risk to the archive. We required training in archive procedures before being given this access, including in cataloguing and correct procedures for retrieval and return of items from the strongroom. Therefore, the *Flooding and Drought* project cannot be used as an example of a universally applicable solution to archival access. Although collaborative projects such as *Flooding and Drought* are valuable (as Chapter 7 will discuss), solutions that can benefit a greater range of researchers are needed.

5.3 Other researchers

Researchers interested in environmental topics can come from a range of disciplinary backgrounds and are trained with different skills and methods of analysis. The responses to the survey of researchers came from staff in history and geography departments and included researchers at varying stages of their careers, including doctoral students, lecturers and research fellows (Table 5.3). When asked about how they considered their disciplinary identity, the most common response was “environmental historian” followed by “historical geographer.” Asking about both department and disciplinary identity allowed consideration of how researchers might cross disciplines. Two responses were from researchers who identified themselves as environmental historians but work within a geography department. Most of these researchers were experienced with using archives. Nine of the eleven responses indicated that they routinely use original documents for their research and only two of the researchers indicated using other kinds of material, in both cases digitised material. In addition, one researcher who was contacted declined to complete the survey on the basis that they have done little relevant work in the last decade and consider themselves to be “a water historical data manager but not a water archive user.” As a result, the survey responses mostly represent experienced archive users, but there are indications of an interest in archive material among some researchers. As a result, the sample is small and partial, representing only researchers with high archival literacy. Therefore, this might not be as useful for understanding inexperienced archive users or researchers whose methodology does not usually involve archival material.

The researchers recorded using a wide range of source material, although the one notable commonality is that many of the records used are the products of administrative processes. The researchers were then asked to list any records that would be ideal for their research but that they had not been able to use. Some of the responses indicated that the ideal records do exist, with one response even stating exactly which records held by The National Archives that they would like to access. Two others indicated that they would like more in-depth or specific records that they were not sure existed, such as harbourmaster's logbooks for smaller harbours. Finally, one response expressed a desire to make use of large volumes of data that require text mining skills and software that the researcher did not yet have. This is further representative of the disciplinary background of most of the researchers surveyed, who are more likely to conduct qualitative research. The body of research that exists using historical meteorological material demonstrates the existence of researchers interested in these records for quantitative analysis as well.

The most frequently used methods for finding material were online catalogues and archival gateway sites, followed by word of mouth and secondary sources (both of which could be considered means of accessing the experience of other archive users or archivists). Further, when asked about additional resources that they use, all those who added their own option under "other" indicated that the experience of other researchers guided them, whether it was from speaking to other scholars or archive users or through secondary literature. The researchers reported using research guides more than other possible resources, but that advice from archivists was more effective for their research. Although subject guides for environmental research are rare, it appears that researchers do make use of the guides that are available.

Even the small sample of researchers surveyed identified a remarkable range of language used to find material (Table 5.3, 5). This included several terms or spellings that reflect the probable wording of the desired source material. One researcher commented that their approach is to use multiple terms "in different contexts (if one does not succeed, try another, is the usual method)," and four others also indicated that combinations of multiple terms was the most successful approach. When they were asked to specify specific terms that had been more successful for finding material than others, they tended to reflect the contents of the records, such as using "waterworks" to find relevant committees or "dry weather" as more useful than "drought." While some researchers indicated that searching "flood" or "floods" could be useful, another indicated that it could produce

irrelevant results, such as records of Henry Flood and Warden Flood, two eighteenth-century Irish politicians.

Only three of the researchers surveyed mentioned poor cataloguing as a barrier to research, although it clearly is a frustration as responses included suggesting better cataloguing and better online access to catalogues. Among the survey responses there did seem to be some understanding of the limits of the archive, and one specifically mentioned archives struggling for funding "so I don't think it's their fault that there's poor cataloguing!" Meanwhile others mentioned a willingness to be persistent in finding material or that the desired information can be "hidden" within source material that is ostensibly about other subjects. Instead of blaming cataloguing, they were more likely to say that their ideal material had not survived, which is "an intractable problem," as one phrased it. Although this cannot be remedied centuries after the fact, the responses did suggest measures that would prevent record loss in the future, such as policies to "force" organisations to retain records or better record keeping in order to assist future historians. Although there are evident frustrations in the survey responses, there is also understanding of what may or may not be possible and a willingness to persist and work with the archive resources available, and one researcher mentioned using the archive rather than a specific question as a starting point for research. There was also a consensus that water is a "hidden" or overlooked topic, both within records themselves and in archive cataloguing.

Table 5.3: Results of the survey of researchers of water histories

1. Departments	
Department of history	3
Department of Geography/Geographical Sciences	6
School of humanities/arts	2

2. Level of experience with archive material	
Primarily uses original documents	9
Primarily uses digitised source material	2

1.a. Self-identified disciplinary identity Three responses recorded multiple identities	
Historian	1
Environmental historian	6
Early modern historian	1
Urban-environmental historian	1
Interested in the social history of ideas	1
Historical geographer	3
Geographer	2
Historical hydrologist and historical climatologist	1
"hesitant in identifying myself to any one group"	1

3. Source material used by responding researchers	
Commissions of sewers (used by three responses)	Engineering reports, diagrams, and correspondence
Correspondence (used by two responses)	Engineering journals
Depositions	Estate/landowners' records
Diaries	Municipal documents
Internal drainage boards' engineers' reports	Scientific diagrams
Legal documents	Parish registers
Maps, plans and surveys	Town chronicles
Minute books	Churchwarden's accounts

Newspapers (used by four responses)	Epigraphic marks
Photographs	Medieval poetry
Water company minutes	Parliamentary papers

3.a. Source material desired by researchers	
Hard data from climate records	Manorial court records at The National Archives
GIS and digital history data	Maps
Large volumes of qualitative data which requires text mining skills and software	Harbour master's logbook for smaller harbours
	More in-depth engineering material
Transcripts of drainage authorities' meetings, or minutes recording how decisions were made, or letters containing this kind of detail	Utility company records
	Drought marks (hunger stones)
	Personal diaries
Commission of Sewer records at The National Archives	Tax/financial records

4. Means of identifying source material used by researchers			
Record office online catalogues	10	Secondary sources	8
Archival gateway sites	9	Record office paper catalogues	5
Word of mouth	9	Online, google-style searching	3

5. Search terms used by researchers			
canal	flood	Llif (Welsh: flow)	stoppage
catchment	flooding	navigation	supply
commission of sewers	floods	overflowings	sychder (Welsh: drought)
ditches	flus	pipe	water
drain	gorlif (Welsh: overflow)	pollution	water committee
drainage	gowt	rainfall	water mill
dredging	hydr*	rhine	waterways
drought	internal drainage	rhyne	waterworks
dry weather	inundation	river	weather
dykes	jetty	sewer	weir
erosion	land drainage	sewers	wet weather
fen	llifogydd (Welsh: flood)	[specific place names]	

6. Research aids used

Each researcher ranked the aids 1-3, these were reversed then added to create a metric of their use (max. 33)

	Frequency	**Usefulness**
Advice from archivists	18	22
Research/subject guides	17	18
Other: fellow researchers/scholars/local historians/secondary literature	6	8

7. Barriers to research identified by researchers	
The data not having been recorded in the first place	6
The data or records you would like to use have not survived	3
Poor archive cataloguing	2
Other	0

7.a. Solutions suggested by researchers (summarised)
More accurate or better cataloguing
Better transfer of paper catalogues to online
Digitisation of specific records, such as Commission of Sewer records and mapping where they exist in local archives
The establishment of a national, digitised water archive
A guide for using parish and manorial records as a resource for water historians

5.3.1 Researchers' own solutions

The survey responses came mostly from researchers with high archival literacy and a willingness to work with existing archival structures, and many came from disciplinary

backgrounds that would incline them towards archive use. A clearer picture of the paradigms through which environmental researchers view environmental data and records is provided by datasets created by environmental scientists using material from archives, which could be considered a form of proxy archive. These can be an alternative to the archive catalogue, or a partial fulfilment of solutions similar to the water histories archive mentioned by one of the researchers surveyed (Table 5.3). These provide the ability to share and create sustainable, long-term access to data,[82] and unite previously fragmented data in one location. Such databases can marry qualitative and quantitative data and by providing descriptions of events tell us about the societal impact of weather (in a way instrumental data cannot).[83] Developing databases and collaborative research environments are beneficial for interdisciplinary study, allowing data to be shared for different uses and forms of analysis without the need for redundant duplication of data collection.[84]

Sangster et al provide a comparison of historical data sources used in the hydrological, meteorological and geophysical disciplines (Table 5.4).[85] From these, the main source of complementary data used in Chapter 4 was the *Chronology of British Hydrological Events* (CBHE). It was first created in 1998 with a very limited budget,[86] and remains an extremely useful resource for studies of historical hydrology in Britain. It was founded with the specific intention of benefitting the field of hydrology.[87] Search results are filterable by river basin and some work is then needed to sort entries if a specific tributary or stretch of river is needed. It does not sort by other boundaries, such as county, or sort by record type. Once records for the River Trent for 1550-1750 had been identified by location, it became clear that few of the entries are from Staffordshire, with several tributaries not

[82] D Riemann et al., "The CRE Tambora.Org - New Data and Tools for Collaborative Research in Climate and Environmental History," *Geoscience Data Journal* 2, no. 2 (2016): 69.
[83] Veale et al., "Dealing with the Deluge of Historical Weather Data: The Example of the TEMPEST Database."
[84] Riemann et al., "The CRE Tambora.Org - New Data and Tools for Collaborative Research in Climate and Environmental History."
[85] Sangster, Jones, and Macdonald, "The Co-Evolution of Historical Source Materials in the Geophysical, Hydrological and Meteorological Sciences: Learning from the Past and Moving Forward."
[86] Black and Law, "Development and Utilization of a National Web- Based Chronology of Hydrological Events."
[87] Black and Law.

represented. There are a large number of records present for Derbyshire, a number around Nottingham, some for the River Idle and Axholme, and a small number for the River Tame is Staffordshire (Figure 5.3). This represents a very different paradigm to that used by archivists. Records often apply to an administrative area and thus tend to follow county, city, or other authority boundaries. The National Council on Archives' rules for constructing and indexing by place names is also oriented around administrative units, not river basins.[88] As demonstrated in Chapter 4, water can sometimes be the basis of administrative boundaries, and frequently crosses them. Research using these boundaries will find it harder to access records held by the CBHE, and additional work is needed by the researcher if a narrower or different area than the river basin is needed.

Table 5.4: Databases of hydrological and meteorological data

	Launch	**Span**	**Area**
The international Atmospheric Circulation Reconstructions over the Earth ACRE) initiative Digitised data underpinning 3D weather reconstructions (reanalyses) https://www.met-acre.net/index.htm		Roughly 1750 onwards	International
Deutscher Wetterdienst https://www.dwd.de/DE/Home/home_node.html			Germany
The Japan Climate Data Program https://jcdp.jp/			Asia
Le répertoire des repéres de crues (The flood marks directory) http://carmen.developpement-durable.gouv.fr/18/PHEC.map			France
Euro-Climhist https://www.euroclimhist.unibe.ch/en/	Database since the 1970s, online access since 2006	Medieval onwards	Europe
Chronology of British Hydrological Events (CBHE) http://www.cbhe.hydrology.org.uk/	1998	9 - 2000	Britain
Climatological Database for the World's Oceans 1750-1850 (CLIWOC) http://webs.ucm.es/info/cliwoc/	2006	1750-1850	Europe
UK Colonial Registers and Royal Naval Logbooks: making the past available for the future (CORRAL) http://archive.ceda.ac.uk/corral/	2008	18th – 20th centuries	International
Llên Natur https://llennatur.cymru/	2009		Wales
Flood chronologies http://ceg-fepsys.ncl.ac.uk/fc/	2019	1700 - 2013	North and south-west England

[88] National Council on Archives, "Rules for the Construction of Personal, Place and Corporate Names," 1997.

It is also not possible to sort or search by record type (although a keyword search for quotation source is possible, this relies on source titles containing the relevant keywords). The records used are a mixture of primary and secondary sources (including books and websites such as British History Online). Of the seventy-one records for the Trent from 1550 to 1750, three are from source material contemporary to the event recorded (the Newcastle Courant). The rest are a mixture of different secondary source materials. Using secondary material is not in itself a problem. However, a reference to the individual primary source material, as more recent databases such as *TEMPEST* includes, makes it easier for the researcher to locate the original record. Published material can be challenging to find if it is out of print, and websites can cease to exist (several of the records on CBHE contain broken weblinks). Despite these issues, the CBHE is a useful and important resource for research such as the present study. It has also set a precedent for other online datasets such as *TEMPEST* that can adapt to new research interests.

TEMPEST was created from the AHRC funded project *Spaces of Experience and Horizons of Expectation: The Implications of Extreme Weather in the UK, Past, Present and Future* (2013-2017), a collaboration between the Universities of Nottingham, Aberystwyth, Glasgow and Liverpool, which covers extreme events from 1700 onwards.[89] Most of the records cover a series of 'case study regions' (NW Scotland, Central England, Mid-Wales and SE England), however records from across the UK have been included. Unfortunately for this study, this has not included many entries from Staffordshire between 1550 and 1750, with storms in 1720 and 1742 being the only entries present. However, the database now contains over 18,000 individual accounts of 'weather' events.[90] Each record contains the date, details of the source material, places, type of event as well as transcription of key quotes and the impact and responses to the event. The structure behind the *TEMPEST* database includes extensive metadata, as such it contains more historiographical information than most other historical 'weather' databases, therefore the *TEMPEST* database could be extremely useful for other research similar to this thesis. Unlike the CBHE, it is possible with *TEMPEST* to filter by record type and the response to the weather event recorded (e.g. insurance claim or migration).

[89] "TEMPEST Database - The University of Nottingham."
[90] Veale et al., "Dealing with the Deluge of Historical Weather Data: The Example of the TEMPEST Database."

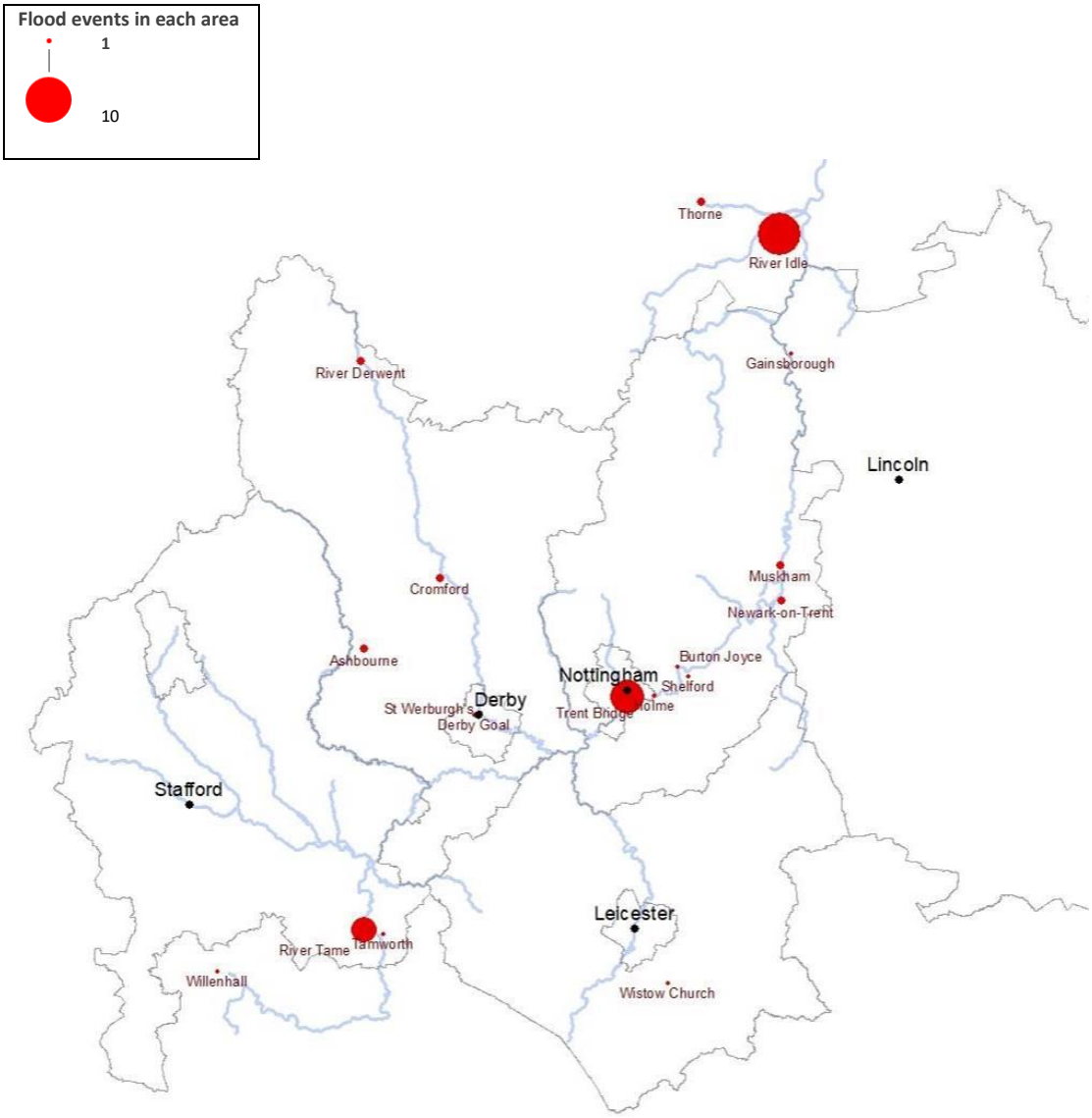


Figure 5.3: Flood locations along the Trent based on data from CBHE[91]
For entries without an exact location, an approximate midpoint has been selected.

While these resources are valuable interdisciplinary tools, they have often originated within disciplines that have not traditionally used archives and reflect the discipline they are

[91] Boundary-Line™ [SHAPE geospatial data], Scale 1:10000, Tiles: GB, Updated: 18 September 2018, Ordnance Survey (GB), Using: EDINA Digimap Ordnance Survey Service, <https://digimap.edina.ac.uk>, Downloaded: 2019-04-16 14:12:18.604
OS Open Rivers [SHAPE geospatial data], Scale 1:25000, Tiles: GB, Updated: 18 October 2018, Ordnance Survey (GB), Using: EDINA Digimap Ordnance Survey Service, <https://digimap.edina.ac.uk>, Downloaded: 2019-04-16 16:11:23.366

designed for. Different disciplines and subdisciplines have different histories of using historical source material (as discussed in Chapter 4).[92] www.tambora.org and ACRE are both primarily climatological, the CBHE is primarily hydrological, whilst the *TEMPEST* database focuses on extreme weather. Most relevant to this research are the CBHE and *TEMPEST* databases, both databases cover weather and hydrological events in the UK, though the focus of each differs, the former focused on hydrological events (floods, droughts and other notable events) whereas *TEMPEST* records all weather types and associated impacts.

These databases require large datasets. Many have sought to integrate datasets from different researchers, through Collaborative Research Environments such as tambora.org or through registered contributors as with the CBHE (which requires registration to input data, while being freely accessed).[93] Comparable resources created for historians have tended to consist of digitised original texts. Early English Books Online, Eighteenth Century Collections Online, The Times Digital Archive, Project Gutenberg and the Old Bailey Online provide access to records via scans, transcription or text recognition.[94] Each of these is searchable in a variety of ways, but they provide access to records, whereas datasets created by environmental scientists provide access to the events recorded (with information on the relevant sources). These have provided new ways of accessing large volumes of historical data, such as Hitchcock making use of data mining techniques with digitised Old Bailey records.[95] There are advantages and disadvantages to each approach to providing access to data online. Datasets such as the CBHE or *TEMPEST* are targeted to specific research

[92] Sangster, Jones, and Macdonald, "The Co-Evolution of Historical Source Materials in the Geophysical, Hydrological and Meteorological Sciences: Learning from the Past and Moving Forward."
[93] Black and Law, "Development and Utilization of a National Web- Based Chronology of Hydrological Events."
[94] "Early English Books Online - EEBO," accessed April 18, 2018, http://eebo.chadwyck.com/home; "Eighteenth Century Collections Online," accessed September 2, 2020, https://quod.lib.umich.edu/e/ecco/; "The Times Archive | The Times & The Sunday Times," accessed September 2, 2020, https://www.thetimes.co.uk/archive/; "Free EBooks | Project Gutenberg," accessed September 2, 2020, http://www.gutenberg.org/; "Old Bailey Online - The Proceedings of the Old Bailey, 1674-1913 - Central Criminal Court," accessed September 2, 2020, https://www.oldbaileyonline.org/.
[95] Tim Hitchcock and William J Turkel, "Text Mining for Evidence of Court Behavior," *Law and History Review* 34, no. 4 (2016): 929–55, https://doi.org/10.1017/S0738248016000304; Tim Hitchcock, "Historyonics: Big Data," accessed August 18, 2020, https://historyonics.blogspot.com/search/label/Big Data.

interests and therefore include only the relevant section of the record. Some of the issues with CBHE's lack of transparency with records are resolved with *TEMPEST* providing information for where records can be located. Online collections are less targeted so bring with them issues with keyword searching, but they do provide a fuller context for the records, which may assist with analysis. However, the volume of work required in creating these collections means they are usually only a possibility for an organisation with considerable resources or for key collections. This leaves this out of reach for most holdings of a local record office such as the Staffordshire Record Office. There are no perfect solutions to enabling access to records or data for environmental research. By recognising the different paradigms under which different professionals and scholars work, and acknowledging a need to continually adapt, solutions can be found that significantly help.

5.4 Solutions and implementation

These different methodologies suggested a range of possible solutions to archival issues. Evidence from the listserve survey of archivists can provide an indication of how achievable these solutions are, by offering examples of existing practice that already fulfil these recommendations. Experience from the *Historic Flooding and Drought* project demonstrated that by working in collaboration with an archive, it becomes much easier for a researcher to find useful material. The records I used often did not directly mention flooding and were rarely "about" flooding. Working alongside both staff and volunteers presented the opportunity to benefit from the experience of people who had a far greater familiarity with the archive than me. Although collaborative projects and engagement with research communities is being advocated for here, it is not possible to do this with every researcher. Catalogue enhancement is another possibility for improving access for environmental research, however it has issues. It may not always be possible to undertake the level of enhancement that would be desirable. Catalogue enhancement is also less likely to help locate indirect evidence of the environment, and certain measures (such as indexing improvements) are only relevant if they aid search functionality.

In the light of these challenges, the subject guide becomes a more attractive option. Subject guides (a form of finding aid focusing on subject content and often targeted at specific research uses and users) are being suggested for three reasons. First, there is

evidence that researchers do use them when aware of them, as the survey of researchers suggested they consult them with similar frequency to seeking advice from archivists (Table 5.3). Second, they represent a means of sharing knowledge and experience of an archive's holdings that can be more readily available to most researchers than collaborative projects. Finally, they are more achievable than ambitious catalogue enhancement, and by creating guides which aid in the interpretation of records of administration, may help guide researchers to records with indirect relevance for environmental research.

5.4.1 Environmental mindedness

Any activity related to the environment needs to be underpinned by the archivists being aware of the potential of their holdings to support environmental researchers but will also develop this awareness. All survey responses listed specific material that the archivists suggested might be useful for environmental history. The volume of the material suggested by only a small number of repositories indicates that these archivists are aware of the potential of their repositories for environmental research (Appendix IV). However, the archives who responded are likely to be the ones for which the archivists felt able to provide useful answers, which may be due to having received previous queries.

Of the ten questionnaire responses, six expressed being aware of visitors being interested in environmental topics, although none of them had a recording system that would allow easy monitoring of visitors interested in the environment. A lack of digital recording of the reasons for a visit make visitor information challenging to access, for example Angelsey Archives does have a database of distance enquiries but the visitor signing-in book is not searchable. When the reasons for visiting are recorded, generally the categories used are based on the purpose of the visit rather than the topic of the research, and environmental topics can fall under several of the categories used (Table 5.5). Even when the topics of research are recorded, the user generally self-identifies the nature of their research, so standard terms are not used. As a result, awareness of interest in environmental research might depend on the individual experience of archivists.

Table 5.5: Categorisation of visitors in UK archives

Survey of Visitors to UK Archives[96]	**Bedfordshire Archives & Records Service**
Family history research Local history research Academic research To gather information for a talk / publication / presentation Architectural / building / site research To find information relating to my work Military research To find information for the organisation I volunteer at General browsing / familiarising myself with the archive Accompanying a friend / family member who is undertaking research Am in the area / here on holiday / have time Other	Family history House history General or local history Land legal i.e. investigation for legal reasons such as planning Boundary disputes Rights of way claims

Although all the responding archivists were aware of potentially useful material held in their repositories, this may in some cases be due to user queries drawing attention to this potential. Among the archivists who were aware of queries about environmental topics, there sometimes seemed to be a clear reason (at least in the mind of the archivist) why their archive may receive interest in environmental topics. As the East Riding of Yorkshire has one of the fastest coastal erosion rates in Europe,[97] the archives receive enquiries related to this and the lost villages of Holderness. Meanwhile, the University of Exeter Special Collections linked their enquiries to the *Parish Maps* project (and expressed a hope for more enquiries). The National Monuments Record of Wales reported receiving enquiries "quite often" (usually from Natural Resources Wales or students) but is unusual in its provision for environmental enquiries. The response noted that their material is georeferenced and coupled with discussion between users and staff, this enables them to locate material across different collections. Archives might also receive enquiries under Environmental Information Regulations, which require public authorities to make environmental information available to the public through electronic means (with some exceptions such as to protect personal data) or because current planning legislation requires an historical flood risk analysis.[98] Four repositories responded that they were

[96] Cipfa, "Survey of Visitors to UK Archives 2018."
[97] Claudia Furlan, "Hierarchical Random Effect Models for Coastal Erosion of Cliffs in the Holderness Coast," *Statistical Methods and Applications* 17 (2008): 335–50.
[98] The National Archives on behalf of HM Government, "The Environmental Information Regulations 2004," 2004, https://www.legislation.gov.uk/uksi/2004/3391/contents; Department for Communities and Local Government, *Planning Policy Statement 25: Development and Flood Risk Practice Guide*, 2009, www.communities.gov.uk.

aware of such enquiries, Kings College Cambridge and three local authority archives (Bath, Bedfordshire and the East Riding). Bedfordshire noted that as most material is marked as open, the only request that they have logged in the last seven years was one that they were asked to answer for Central Bedfordshire Council, however the council itself had received 540 EIR enquiries in 2019-20 and it is not known whether any of the departments these were directed to then used the archives service. While collections being as open to access as possible is desirable, it may mean that the interests of many researchers do not come to the attention of archivists.

5.4.2 Cataloguing practice

One point reinforced by the survey of archivists was that ambitious catalogue enhancement might not always be a practical solution. Most of the responding archives acknowledged ongoing work to catalogue records or move the catalogue online, whether through their own site or Archives Hub, and several mentioned legacy data that did not meet their current standards. All repositories said that the records they had suggested as being relevant for environmental research were mostly or completely catalogued. Eight repositories reported using indexing, although one said that only a small number of records are indexed. Of these, only four reported using subject headings relevant to the environment, with Bedfordshire Archives & Records Service listing an exceptionally detailed array of terms, including types of tree (Table 5.6). Additionally, although the National Monuments Record of Wales did not report subject headings, they did say that everything is site indexed and they use the MIDAS Heritage Data Standards.[99] Even if it were possible, cataloguing for a specific research topic may be challenging. Researchers are not usually fully aware of the processes involved in an archive, so are unlikely to specify what would constitute "better" cataloguing. In addition, the specific needs of researchers may depend on their disciplinary background and types of research and analysis they employ, so is likely to be highly variable. What is more helpful is for access to be prioritised over detailed

[99] Historic England, "MIDAS Heritage," accessed March 17, 2021, https://historicengland.org.uk/images-books/publications/midas-heritage/.

cataloguing (in line with MPLP), but for there to be means of mediating between the different paradigms by which archivists and researchers view records.

Table 5.6: Indexing among responding repositories

Name of Repository	Index	Terms related to water management or flooding
Anglesey Archives	Card index	There are subject headings for Flood and Flood defences but not one for environment.
Bedfordshire Archives & Records Service	In-house thesaurus, noted to have "got a bit out of hand in the 20 years since we started using cataloguing software rather than a card index" and have inconsistencies.	Weather (and meteorology and climatology), snow, blizzard, drought, earthquake, fog, frost, hail, ice, lightning, rain, storms, thunderstorms, tornado, wind, environmental issues, pollution, noise, waste disposal, conservation, environment, recycling, minerals & mining, quarries, gravel pits, mineral rights, trees [as well as types of tree], flowers [as well as types of flower], birds, animals, etc.
Expatriate Archive Centre	UKAT, the only term used in their Authority list is 'environment'.	No
East Riding Archives and Local Studies https://www.eastridingarchives.co.uk/	Authority files to link catalogue records to a 'subjects' and/or 'place'. The caveat is not all collections are indexed by subject, so researchers are required to use the "any text" search option which will search descriptions for words such as 'weather'	Indexing terms in the subject thesaurus include Environmental Health, Drainage, Rivers, Bridges, Water, Coastal Erosion, Floods.
University of Exeter Special Collections	Very little has been indexed	
King's College Cambridge	The Governing Body minutes and GS/2/5 are indexed. The mundum books are easy to find your way around, being (depending upon the era) of a fixed format.	
National Monuments Record of Wales	Everything is site indexed and uses the MIDAS Heritage data standards[100] to record information	
University of East Anglia Archives	Library of Congress Subject Headings.	Floods, water conservation, sea defences
The Royal Society	None	
Bath Record Office	None, however, the catalogue is fully text searchable.	

[100] Historic England.

5.4.3 Research guides

One way to mediate between different perspectives would be to use research guides, which are also the easiest to implement of the suggestions from researchers, such as one for parish and manorial records that one suggested (Table 5.3). To date, there has been little scholarly attention paid to research guides, and it has not focused on subject guides. Heather MacNeil and Jennifer Douglas have discussed the first research guides. They focused on the history of the records and framed the PRO as the rescuer and protector of records, although in 1923 this history was absent and the PRO was framed in terms of its legal authority, although the guide from 1963 returns to some of the heroic rhetoric of earlier guides. [101] F. G. Emmison pioneered the county record office guides, focusing on practical advice and classification of records.[102] These county record office guides have been analysed by Rosemary Lynch, who demonstrated that they were created in response to user needs.[103] However, discussion of more recent creation of the online guides now available is missing, along with discussion of subject guides.

Only three of the responding repositories indicated that they held any research guides that were relevant to environmental research: Bath Record Office, University of Exeter Special Collections and the British Library, although guides held by other repositories, including the Staffordshire Record Office and The National Archives, have also been searched for (Table 5.7). Bedfordshire Archives & Records Service reported that while staff were working from home, many subject guides were being revised, but this did not necessarily include anything for environmental history. The University of Exeter Special Collections holds specific guides for climate emergency resources and geography and environmental sciences, the latter of which points users towards maps, the Common Ground Archive, local studies and south-west writers' collections and material related to water in Oman. The

[101] Heather Macneil and Jennifer Douglas, "The Generic Evolution of Calendars and Guides at the Public Record Office of Great Britain, ca. 1838–1968," *Culture: A Journal of History* 49, no. 3 (2014): 48, https://doi.org/10.1353/lac.2014.0012.
[102] F. G. Emmison, *Guide to the Essex Record Office* (Chelmsford: Essex County Council, 1969).
[103] Rosemary Lynch, "Helping ' Those Who Have the Wisdom and Enthusiasm to Search ' : An Analysis of County Record Office Guides" (University of Liverpool, unpublished dissertation submitted for a Masters in Archives and Records Management, 2017).

British Library also holds a guide to science and the environment in India Office records and The National Archive has one on pollution. Although the responses themselves did not make these connections, it is perhaps not surprising that there would be responses from repositories within Bath and Exeter. Bath's famous history with sanitation is publicised as a draw of the city today by Visit Bath[104] and the Met Office is in Exeter, which probably raises awareness of water and environmental issues. Other than these examples, guides for environmental topics seem unusual, and it is more common for repositories to hold guides for potentially related topics such as maps or agriculture.

These findings are consistent with the responses from researchers, who indicated that subject guides are often used but are not (currently) the most useful resources for research. Few research guides are directly relevant for environmental research, so researchers make use of indirectly relevant ones, such as for maps and plans or for source types. MacNeil's work on finding aids as a genre system draws on the literature of archives as socially constructed and considers them as placed in "a discourse community comprising archivists and users of archives."[105] However, the use of archives for environmental research represents a community (or communities) of archive users for which research guides as they have traditionally existed may not be fit for purpose. As researchers of the environment can come from a variety of disciplinary backgrounds, they will include researchers who have not been part of this "discourse" and who may not have the background knowledge that the finding aid assumes. The shift from records-focused to user-focused finding aids and the move online has brought attention to previously hidden users.[106] Environmental researchers can be counted among these invisible researchers, however until now their needs have received little attention, which may make it challenging to create resources to support them. Providing guidance for subject guides is a sufficiently complex topic that it will be explored more fully in the next chapter.

[104] Visit Bath, "Bath's Official Tourism Site," accessed August 20, 2020, http://visitbath.co.uk/.
[105] Heather Macneil, "What Finding Aids Do: Archival Description as Rhetorical Genre in Traditional and Web-Based Environments," *Archival Science* 12 (2012): 94.
[106] Macneil, 488.

Table 5.7: Research guides held by responding repositories, the Staffordshire Record Office and others searched for potential relevance.
This cannot be considered a comprehensive list of research guides held by repositories in the UK.

Staffordshire Record Office
Guides to Maps and topography
https://www.staffordshire.gov.uk/Heritage-and-archives/publications/GuidestoMapsandTopography.aspx
Guide to Sources No.3 - Tithe Maps and Awards
Guide to Sources No.5 - Enclosure Acts, Awards and Maps
Local and community history > Landscape and maps
https://www.staffordshire.gov.uk/Heritage-and-archives/Local-and-community-history/Landscape/Understanding-Landscape-Introduction.aspx
Staffordshire Place Guide
https://www.staffordshire.gov.uk/Heritage-and-archives/Local-and-community-history/placeguide/Staffordshire-Place-Guide.aspx
Bath Record Office
A guide to Public Health Records at Bath Record Office is to be published both as a short pamphlet and longer on-line guide by the end of 2020
Borthwick Institute for Archives
Tithe Awards and Maps at the Borthwick Institute
https://www.york.ac.uk/media/borthwick/documents/3.1.4Tithemap.pdf
University of Exeter Special Collections
https://libguides.exeter.ac.uk/archives
The Common Ground Archive
Archives and Special Collections: Geography and Environmental Studies
Climate Emergency: Resources
Gloucestershire Archives
https://www.gloucestershire.gov.uk/archives/starting-your-research/research-mini-guides/
Farms, Farmers & Agriculture
Floods and Flood Defences
Hedgerows
Inclosure maps
Maps (General)
Ordnance Survey Maps
Plans of Railways, Roads & Canals (public schemes)
Property Boundaries
Public Rights of Way (footpaths & bridle ways)
Tithe Maps and Apportionments
1910 Valuation Maps
London Metropolitan Archive
https://search.lma.gov.uk/scripts/mwimain.dll/144/UNION_VIEW?DIRECTSEARCH&INDEXLIST=Y&OPTION=FIRST&KEYNAME=SEARCH_TERMS&FORM=[LMA]research-guides.html&KEEP_HOME_SESS=Y
Extensive list of topics, few are directly related to the environment but there are many potentially useful ones, including:
bridges, enclosure maps, gardening, landscaping, local history, open spaces, Thames, etc.
The National Archives
https://www.nationalarchives.gov.uk/help-with-your-research/research-guides-keywords/
Environmental pollution and damage
Agriculture
Agricultural statistics of England and Wales
National Farm Survey of England and Wales 1941-1943
Maps, plans and charts
Enclosure awards and maps
International boundaries
Irish maps c.1558-c.1610
Maps and plans
Military maps of the First World War
Military maps of the Second World War
Ordnance Survey
Overseas maps and plans
Sea charts
Tithes

Other
Public rights of way, roads and other highways
Villages and the countryside
Garden history records held by other archives
British Library
Guide to Sources for Science and the Environment in the India Office Records
Sheffield Archives & Local Studies
https://www.sheffield.gov.uk/home/libraries-archives/access-archives-local-studies-library/research-guides
Boundary changes research guide
Clean air research guide
Flood of 1864 research guide
Green Belt
Kinder Trespass 1932 research guide
Parks and gardens research guide

5.4.4 Engagement with research communities

Historic Flooding and Drought was a collaborative project, and thus provided a means for a dialogue between archive staff and researchers, bringing the perspectives of both. Such projects can (as will be discussed in the next chapter) lead to further unexpected benefits for both the archive and the researcher. While it is not possible to provide this level of access to every researcher, they can be one means for an archive to engage with environmental research, and collaborating as part of a larger project may have the potential contribute to larger projects, similar to how the *Staffordshire Place-Names* project is has continued the work of the *English Place-Name Society*,[107] or volunteer groups have contributed to *Victoria County History* research.[108] It can also lead to further projects and collaboration, such as how this project led to the *Building Climate Resilience through Community, Landscapes and Cultural Heritage* project.[109]

[107] The Institute for Name-Studies at the University of Nottingham in collaboration with Staffordshire Record Office, "The Staffordshire Place-Name Project," accessed November 30, 2018, https://staffordshireplacenames.wordpress.com/.
[108] Institute of Historical Research, "Victoria County History," accessed February 25, 2021, https://www.history.ac.uk/research/victoria-county-history; Staffordshire and Stoke on Trent Archive Service, "Victoria County History of Staffordshire," accessed February 25, 2021, https://www.staffordshire.gov.uk/Heritage-and-archives/Local-and-community-history/victoriacounty.aspx.
[109] UKRI: UK Research and Innovation, "Building Climate Resilience through Community, Landscapes and Cultural Heritage," accessed February 25, 2021, https://gtr.ukri.org/projects?ref=AH%2FV003569%2F1#/tabOverview.

The resources that were suggested by archivists also include several examples of outreach related to environmental themes or archives highlighting specific collections (Table 5.1). For example, the University of Exeter Special Collections ran the *Confluence* project, which grew out of other work with the Common Ground archive and involved music workshops, courses, concerts and events.[110] The archivist from Bedfordshire described an exhibition created approximately twenty years ago on historic flooding for the local county show. These outreach projects may be part of the reason these repositories felt drawn to respond, however the breadth of repository types (including local record offices, university archives and specialist archives) may suggest there is a wider potential of archives across the sector for both environmental research and environmentally-themed outreach, which would be in keeping with the aims of *Archives Unlocked* vision for the sector produced by The National Archives.[111]

5.5 Conclusions: Good, better, best practice

Although the experience of working with volunteers on the *Historic Flooding and Drought* project allowed privileged access to archives, there are ways in which it can be compared to other researchers. Like many researchers, I made use of administrative records and was more concerned with the mundane than the exceptional. I also benefitted from previous experience in guiding research. Particularly of help was the experience of the archive staff and the volunteers on the project, which included one very experienced archive user. While this is not a typical research experience, other researchers reported benefiting from the experience of other scholars, local historians, archive users and existing literature. Contact between researchers through conferences, workshops and research networks are one way in which this is facilitated, and the creation of databases and collaborative research environments allow the sharing of data and the ability to combine data gathered from multiple repositories by multiple individuals. The "social capital" that Johnson and Duff

[110] University of Exeter Special Collections, "Cataloguing the Common Ground Archive: 'Confluence' and 'Rhynes, Rivers and Running Brooks,'" accessed November 19, 2020, http://specialcollections.exeter.ac.uk/2019/08/29/cataloguing-the-common-ground-archive-confluence-and-rhynes-rivers-and-running-brooks/.
[111] The National Archives, "Archives Unlocked: Releasing the Potential"; The National Archives, "Archives Unlocked: Delivering the Vision," 2017, www.nationalarchives.gov.uk/archives-sector.

identified in the context of American archives[112] is in the UK replicated through varying sources and was reflected in the results of the survey of archive users – other researchers, academic networks and collaborations and advice from archivists.

Although it seems that often researchers are persistent in making use of available resources, there are measures archives can take to help facilitate environmental research. Some of the desired support that researchers suggested may not be achievable for most repositories. No single approach will work for every repository, as different archives have different resources and practices in place. The repositories surveyed were varied in type and existing accessibility for environmental research. As a result, a variety of options for practice are recommended, that can be adapted according to what is most relevant. Ambitious catalogue improvement projects may be a lesser priority even when it is possible, as the records researchers have recorded favouring administrative records that might not be ostensibly "about" the environment. Meanwhile, the relevance of indexing will depend on current practices and the configuration of the repository's online catalogue. Not every repository uses indexing, and different repositories use different thesauri, therefore decisions on whether or how to use indexing should be trusted to the archivist's expertise. The evidence from the researcher survey suggests that researchers are able and willing to be adaptable while searching archive catalogues, and the best way to support their research is to help them benefit from the experience of other researchers and archivists.

Tiered approaches to standards, such as Chilcott's, are an established part of the archival profession. Archive Service Accreditation standards are scalable based on the size and type of archive, and there are different levels for local authority archives, other public sector archives and private or third sector archives.[113] The Benchmarks in Collection Care for Museums Archives and Libraries 2.1 published by the Collections Trust also takes a tiered approach, detailing basic, good and best policy in their self-assessment checklist.[114] The

[112] Johnson and Duff, "Chatting Up the Archivist: Social Capital and the Archival Researcher."
[113] The National Archives, "Archive Service Accreditation Scalability," 2018, https://www.nationalarchives.gov.uk/documents/archives/archive-service-accreditation-scalability-2016.pdf.
[114] Alex Dawson, "Benchmarks in Collection Care for Museums Archives and Libraries: A Self--assessment Checklist Benchmarks in Collection Care 2.1," 2018.

National Archives, as a leader in the archives sector in England, produced an ambitious vision for the sector in 2017, *Archives Unlocked.*[115] Their plan for "delivering the vision" recognises the need for scalability, with the intention that all archives will be able to access the skills and infrastructure to achieve their aims, through sharing, co-location, collaborative networks and consortia.[116] Any recommendations for archive improvement need to account for differing resources and capabilities between archives, and therefore need to either be tiered to allow archives to pick the approach best suited to their service, or to be entirely achievable with minimal resources. A tiered approach is preferable as it can provide both a minimum standard as well as reflect the ambition of *Archives Unlocked.* The biggest difference between the guidelines presented here and Chilcott's is that I consulted both archivists and archive users (rather than just archivists) to account for both user opinions and the need for scalability.

There are varying measures that can be suggested to support environmental research in archives (Table 5.8). For environmental research, good or basic level practice could be based on an amalgam of practices already demonstrable in some local authority archives, that could be attainable for most repositories. Meanwhile best practice might include examples such as georeferencing in the National Monuments Record of Wales. In this context, good/better/best is being used over basic/good/best as this guidance is aimed at already accredited archives. "Good" is therefore preferable over "basic" as it better reflects that the archive may otherwise provide excellent service but not have previously had much demand for environmental research. There are also several things that are not included in the table below because they support archive use more generally and are not specific to environmental research, such as completeness of cataloguing. To allow for both differing archival practices and differing approaches by researchers, the recommendations below include multiple ways of accessing the archive, including advice from archivists, subject guides, indexing and outreach or profile-raising activities that might highlight relevant material. The latter point might not seem immediately beneficial to research, however almost half of the researchers responding to the survey indicated that they benefitted in some way from other researchers' experience. Profile-raising activities and collaborating

[115] The National Archives, "Archives Unlocked: Releasing the Potential."
[116] The National Archives, "Archives Unlocked: Delivering the Vision."

with researchers will help highlight the relevance of collections for environmental research and possibly inspire projects. Some measures have also been highlighted as priorities as they are more likely to be widely applicable than measures that may be helpful, but only if they can be embedded in practices that the repository already uses (such as indexing). In comparison, subject guides and outreach projects are more likely to be obtainable even if they are not at present common practice.

However, it should be noted that a detailed catalogue that allows for free text search is extremely beneficial for environmental research, as it would be for many research topics. One of the most useful aids for this study was the detailed description of the Quarter Session records, allowing relevant entries to be easily identified. The cataloguing was so detailed that often consulting the original document did not provide any information not already present in the catalogue. This was due to a volunteer project that has been running for several years to catalogue the Quarter Session records. The volunteers are not restricted by the same priorities as the archivist, so are able to take a relatively leisurely approach and note interesting details. This will still be affected by individual and group subjectivity, although this is perhaps outweighed by the benefits of capturing detailed information. The research for this study also made use of volunteers in the archive, through the project *Historic Flooding and Drought.* It was different from the Quarter Sessions project in being focused on research rather than cataloguing and being the result of a collaboration between the Staffordshire Record Office and the geography department at the University of Liverpool.

Table 5.8: Best practice recommendations for supporting environmental research.

Measure	Examples	Proposed level
Environmental mindedness		
1. Staff are aware in a general sense of potential material for environmental research, including the role of administrative bodies in managing environment	All archives with whom there was contact meet this criterion (Table 5.1), however The Royal Society provided a particularly extensive list of material (**Appendix** I)	Good
2. The archive staff are aware of key collections or records of environmental interest	Edwin Coombe, Common Ground	Better
Cataloguing practices		
3. If the repository holds a card index it includes environmental subject headings	Anglesey Archives	Good
4. If the repository digitally indexes records it includes environmental subject headings	Staffordshire Record Office	Better
5. A high percentage of archive material is catalogued to this level of detail	Aimed for by most repositories	Better
6. If the repository digitally indexes records it includes environmental subject headings, which are consistently used across their holdings	No known examples	Best
7. Records are georeferenced or linked to place name authority files	The National Monuments Record of Wales	Best + (Only rarely obtainable)
Subject guides		
8. The repository holds subject or research guides to potentially related topics or material, e.g. maps or agriculture	The National Archives, Staffordshire Record Office (Table 5.7)	Better
9. The repository holds guides to the local area, place names and geography (if relevant)	The Staffordshire Record Office	Better
10. The repository holds subject or research guides specifically for environmental research, including guidance on terminology that the records are likely to use.	The National Archives, the University of Exeter Special collections, The British Library (Table 5.7)	Best
Engagement with archive users		
11. The repository has engaged in outreach or projects with potential (but not direct) relevance for environmental topics		Good
12. The repository has actively engaged in projects or outreach directly related to environmental topics	Bedfordshire – "About 20 years ago we created an exhibition relating to historic flooding in the county for the local county show"	Better
13. The repository has actively engaged or collaborated with researchers interested in the environment	The Staffordshire Record Office – *Historic Flooding and Drought*	Best

6 : Subject guides for the environment

The previous chapter advocated several means for archives to engage with environmental research, and this chapter will further explore how to achieve one of them: the creation of subject guides. As previously mentioned (5.4.3 Research guides), subject guides have not been extensively discussed in archival literature. MacNeil argues for the need to consider archival finding aids as a genre.[1] Many of MacNeil's observations are as applicable to subject guides as to finding aids in general, particularly with the move to online finding aids, a broader audience than "expert" users and the focus on what finding aids *do* over what they *are.*[2] Subject guides need to prioritise access over description and support the ways researchers view and search for records.

Beattie found that many researchers in women's history use names of people, organisations, and government agencies rather than indexes or catalogues, but questions whether this is by preference or due to the finding aids available.[3] A similar question might hang over the conclusions about environmental research discussed in the previous chapter. Without finding aids specific to the interests of the researchers' research already widely available, the survey would not have been able to assess whether researchers find guides specific to the environment useful. In libraries, Matthew Golberg has argued that subject guides are an effective means of serving the needs of historians as they increasingly have relied on online platforms for research and infrequently interact directly with librarians.[4] Christopher Prom's earlier study of electronic finding aids included subject guides (but did not focus on them), and concluded that simplicity without sacrificing completeness is most helpful.[5] However, there is no guidance on how to create a subject guide. Because of this absence, examples of existing guides are the approach adopted to examine the features that a subject guide might need.

[1] Macneil, "What Finding Aids Do: Archival Description as Rhetorical Genre in Traditional and Web-Based Environments."
[2] Macneil, 497.
[3] Beattie, "An Archival User Study. Researchers in the Field of Womens' History."
[4] Matthew Goldberg, "Searching for the Past : Historian's Information-Seeking Behavior and Needs," *Kentucky Libraries* 82, no. 3 (2018): 11–14.
[5] Christopher J Prom, "User Interactions with Electronic Finding Aids in a Controlled Setting," *The American Archivist* 67, no. 2 (2004): 234–68.

This analysis and the research undertaken in (Chapters 2-4) was used to create a subject guide for environmental research at the Staffordshire Record Office (Appendix V), to which reference will be made at points throughout this chapter.

Comparable subject guides were consulted from a variety of archives. Guides were identified for analysis based on the responses of the survey of archives in the previous chapter (5.4 Solutions and implementation), and from the websites of repositories known to hold a range of subject guides (such as The National Archives and the London Metropolitan Archives). From each repository known to hold relevant online subject guides, one was selected to compare features between guides. Where there was not a guide for an environmental topic, a closely related one (usually maps and plans) was selected instead. The resulting sample includes The National Archives and a mixture of local and university archives, providing variety in the archives chosen. In addition, the guide to sexuality and gender identity from The National Archives was added to the list, partly because of the relevance of the similar intellectual difficulties in accessing LGBTQ+ records (Chapter 5), but also because the advice on searching the catalogue included guidance on how language has changed and might affect searching (which was not the case for any of the others).[6] In total eight guides were examined from seven different repositories.

A research guide consists both of a body of information and a structure by which this information is conveyed to the user. The latter may often be overlooked but is very important to the functionality of the guide. The usability of a guide is also dependent on the knowledge base and expectations of its audience, which therefore need to be understood. The likely readership of a subject guide for environmental studies and their requirements are discussed in Chapter 5 and may be summarised here as researchers from a variety of disciplines who may or may not have prior archive experience. They are likely to require indications of the kinds of records that might be useful as well as contextual information that will aid in the interpretation of these records.

The guides were analysed using a similar approach to diplomatic analysis as this provided a means of examining the features of existing guides and creating recommendations in line

[6] "How to Look for Records of Gay, Lesbian and Bisexual History," accessed February 5, 2021, https://www.nationalarchives.gov.uk/help-with-your-research/research-guides/gay-lesbian-history/.

with existing practice. Diplomatics is the form of analysis which originated as a means of establishing authenticity of records, and has developed into the discipline of studying the "genesis, forms and transmission archival documents, and their relationship with the facts represented in them and with their creator, in order to identify, evaluate, and communicate their true nature."[7] As this involves analysis of both the content and structure, it presented a means of examining what elements are included in existing subject guides, and which ones should be included in order to best support environmental research. Structural elements that did not support environmental research were not included in this analysis. For example, some guides included contact details (such as the one for the Sheffield flood of 1864[8]), however the inclusion of contact details does not aid environmental research, and repositories that did not include them displayed contact details elsewhere on their website. Other structural features might depend on the size or type of repository. Both The National Archives and the London Metropolitan Archives have lists of subject terms that link to relevant research guides, which LMA describes as a list of subjects and TNA as an index.[9] These aid navigation for repositories with large numbers of guides (TNA has 359), but would be redundant for a repository with fewer.

Because there is no standard format for subject guides, identifying common elements is not always straightforward. Some elements, such as links to guides for types of record, to other resources, or a bibliography are easy to identify. However, it is harder to define what constitutes "background" information as this can include a variety of information types. For the purposes of this guidance, the following elements have been examined (Table 6.1):

a) Background information: this could also be described as introductory or contextual information. Any information to aid a researcher in understanding the topic might be relevant and can be very varied. This might include (but is not limited to) key

[7] Luciana Duranti, "View of Diplomatics: New Uses for an Old Science, Part I," *Archivaria* 28 (1989): 17; Heather MacNeil, *Trusting Records : Legal, Historical and Diplomatic Perspectives* (Dordrecht: Springer, 2000), 86.
[8] "Sources for the Study of The Sheffield Flood 1864," 2009, https://www.sheffield.gov.uk/content/dam/sheffield/docs/libraries-and-archives/archives-and-local-studies/research/Flood study guide v1-6.pdf.
[9] "Research Guides Keywords - The National Archives," accessed February 8, 2021, https://www.nationalarchives.gov.uk/help-with-your-research/research-guides-keywords/; "London Metropolitan Archives Collection Catalogue : Research Guides," accessed February 8, 2021, https://search.lma.gov.uk/SCRIPTS/MWIMAIN.DLL?GET&FILE=[WWW_LMA]research-guides.html.

dates, legislation, important national and local organisations to be aware of or topographical information (such as major rivers). Some of this is specific to some locations but other background information is more generic.

b) Search advice: any advice on searching the catalogue or identifying material, including the suggestion of key words or suggestions of areas of the catalogue to search within.

c) Key collections/sources: identifying and suggesting specific source material that might be of interest.

d) Links to guides to records: if the repository also holds guides for record types, links can be provided to give supporting information about records (for example, TNA's guide to environmental pollution and damage links to the guide on bomb census survey records for 1940-45[10])

e) Structure: rather than using record types as headings, many of the subject guides used topics, which is more accessible to a user unfamiliar with archive use.

f) Links to other resources or bibliography: several subject guides also provided suggestions for supporting material, including research on the topic, records held by other repositories or links to other relevant organisations.

In addition, the guide for sexuality and gender identity history from The National Archives included guidance on what could be found online, something not found in other guides.

With little available literature on subject guides or data on their use, determining what elements are most useful is challenging, and therefore the guidance below is proposed as a starting point rather than the final word on subject guides. It is based on identifying the common features of existing guides, on the basis that these are likely to represent distillation of good practice and subjecting them to critical analysis based on the knowledge

[10] "Environmental Pollution and Damage - The National Archives," accessed June 22, 2020, https://www.nationalarchives.gov.uk/help-with-your-research/research-guides/environmental-pollution-damage/; "Bomb Census Survey Records 1940-1945 - The National Archives," accessed March 3, 2021, https://www.nationalarchives.gov.uk/help-with-your-research/research-guides/bomb-census-survey-records-1940-1945/.

of the likely readership reached through the survey. The main principle guiding decisions on this guidance is that the subject guide should not assume prior knowledge on the part of the researcher. Although academic researchers will have a great deal of expertise, environmental researchers will come from a diverse range of disciplines so their training and background knowledge will vary.

The most basic element of needed for a subject guide is to recommend possible material. This might be specific items, series, or whole collections. Two guides primarily highlighted potentially useful source material, with some links to guides for the particular record type or collection (Table 5.7).[11] While this approach can highlight some very interesting material, it will not necessarily satisfy the needs of many environmental researchers. Chapters 2-4 made use of material that is not "about" the environment, so would not feature in a guide of this style. In addition, this thesis has referred to studies that have made use of proxy data (such as harvest dates and grain prices). This means that "obvious" examples of useful data (such as meteorological data, which is usually from the more recent past) are by far not the only material of interest.

A subject guide for the environment would therefore be more useful if it is able to lead researchers to a greater variety of source material, particularly records not obviously relevant to the environment. A successful subject guide would be able to assist researchers in finding a variety of source material and variety of types of data. It would also need to account for the different methods of analysis researchers may use. Some research guides may provide indications of what data to expect, for instance a researcher may have certain expectations of "statistics." However, none of the guides consulted here appeared to consciously detail what types of data a researcher might find, such as whether the material is primarily descriptive or whether there is quantitative data present. By providing contextual or background information, a research guide can go further than suggesting material. It can help guide researchers towards less obvious material and suggest lines of enquiry as much as suggesting material.

[11] University of Exeter Special Collections, "Geography and Environmental Studies," accessed February 5, 2021, https://libguides.exeter.ac.uk/archives/geography-and-environmental-studies; Staffordshire and Stoke on Trent Archive Service, "Landscape and Maps - Staffordshire County Council," accessed February 8, 2021, https://www.staffordshire.gov.uk/Heritage-and-archives/Local-and-community-history/Landscape/Understanding-Landscape-Introduction.aspx.

Background information can be supported further by advice on searching the catalogue and further resources that the researcher could consult. As previously discussed, many records that are useful for the environment may not seem to be obvious choices and usually will not be catalogued in a way that will allow them to be easily found when searching with environmental terms. The guides for The National Archives are particularly useful examples, as they often contain useful background information and advice for searching and the guidance below most closely resembles examples from The National Archives. For example, the guide for sexuality and gender identity history contains advice on language and useful search terms.[12]

[12] The National Archives, "How to Look for Records of Gay, Lesbian and Bisexual History," accessed February 5, 2021, https://www.nationalarchives.gov.uk/help-with-your-research/research-guides/gay-lesbian-history/.

Table 6.1: Features of archive subject guides[13]

Features:

a Background information
b Search advice
c Key collections/ sources
d Links to guides to records
e Organised by topic not by record
f Links to other resources or bibliography

Repository	Guide	a	b	c	d	e	f
Staffordshire Record Office	Landscape and Maps			✓	✓		
The National Archives	Environmental pollution and damage	✓	✓	✓	✓	✓	✓
	Sexuality and gender identity history	✓	✓	✓	✓	✓	✓
London Metropolitan Archives	Records of gardening, parks and open spaces	✓		✓		✓	✓
Gloucestershire Archives	Floods and flood defences	✓	✓	✓			✓
Borthwick Institute for Archives	Tithe Awards and Maps	✓		✓			✓
Sheffield Archives & Local Studies	The Sheffield Flood 1864	✓		✓		✓	✓
University of Exeter Special Collections	Geography and Environmental Studies			✓	✓ (Common Ground archive)		

[13] Staffordshire and Stoke on Trent Archive Service, "Landscape and Maps - Staffordshire County Council"; The National Archives, "Environmental Pollution and Damage," accessed June 22, 2020, https://www.nationalarchives.gov.uk/help-with-your-research/research-guides/environmental-pollution-damage/; The National Archives, "How to Look for Records of Gay, Lesbian and Bisexual History"; London Metropolitan Archives, "56 - Records of Gardening, Parks and Open Spaces in LMA," accessed February 12, 2021, https://search.lma.gov.uk/scripts/mwimain.dll/144/RESEARCH_GUIDES/web_detail_rg/SISN+77?SESSIONSEARCH; Gloucestershire Archives, "Research Mini Guide 50: Floods and Flood Defences," 2017, http://www.lowersevernidb.org.uk/; C. R. Fonge, "Tithe Awards and Maps at the Borthwick Institute," accessed February 12, 2021, https://www.york.ac.uk/media/borthwick/documents/catalogues/3.1.4Tithemap.pdf; Sheffield Libraries Archives and Information, "Sources for the Study of The Sheffield Flood 1864," 2009, https://www.sheffield.gov.uk/content/dam/sheffield/docs/libraries-and-archives/archives-and-local-studies/research/Flood study guide v1-6.pdf; University of Exeter Special Collections, "Geography and Environmental Studies."

6.1 Suggested guide structure

Below is a suggested structure for a subject guide for the environment, although this may be adapted as appropriate depending on the needs of a repository and its users. It includes discussion of why particular elements may be useful for the researcher and notes on what kinds of information to consider including.

6.1.1 Background information/introduction

A subject guide is more useful if it can provide some introductory, background information that will help the researcher understand the topic within the repository's holdings. The types of information recommended as background information are based on the presence of these kinds of information in the sample of research guides (Table 6.2). The only information contained in all the guides was information on local government and policy makers, although this may be in part due to the high representation of local authority archives among the sample. This information was not always presented as part of the initial introduction, but sometimes embedded throughout the guide (particularly as introductions under new subject headings) and may overlap with other content, such as description of recommended material). It also does not need to be lengthy, merely a short summary of information useful to the researcher. The following points should be considered for inclusion:

- Purpose and scope of the guide: This is a common feature of guides at The National Archives and is particularly helpful for aiding less experienced archive users.

- Organisations and governing bodies: It is useful to indicate which organisations have had control or responsibility for the environment, or hold records of the environment. This would include dates for the existence of the organisation and its role. Any body with substantial records of the environment is worth providing a brief explanation for, whether they are national government and policy makers, local government, or non-governmental organisations (including charities, businesses, and estates). In the example in Appendix V, this includes the quarter sessions, local council, water authorities, and estates.

- Land ownership and access: In some cases, it may be relevant to indicate the legal status of land, including private ownership and publicly accessible areas such as national parks. Historic ownership of land may also be relevant, for instance indicating the location and extent of estates.

- Legislation: To aid interpretation of records, it may be useful to note any relevant legislation. This is most likely to be environmental legislation (such as the Environment Act 1995 and the Environmental Protection Act 1990) but might also include legislation for specific industries or administration.

- Key events: Whether this is presented as a timeline or integrated into a descriptive history, it is useful to highlight events key events. This is most likely to include flooding, storms, disasters (human or natural), or major human works affecting the environment/landscape (e.g. founding of a settlement or a landscaping project on an estate).

- Topographical information: this can include relevant information on major rivers, moorland, cities, and any other features of the area covered by the archive's holdings.

Table 6.2: Background information provided in existing research guides and Appendix V

	The National Archives		London Metropolitan Archives	Gl.shire Archives	Borthwick Institute for Archives	Sheffield Archives & Local Studies	Example guide in Appendix V
	Environmental pollution and damage	Sexuality and gender identity history	Records of gardening, parks and open spaces	Floods and flood defences	Tithe Awards and Maps	The Sheffield Flood 1864	
Purpose and scope of guide	✓	✓			✓		✓
National government / policy makers	✓	✓	✓		✓		
Local government / policy makers	✓	✓	✓	✓	✓	✓	✓
Non-governmental organisations		✓	✓			✓	✓
Land ownership	✓						✓
Relevant legislation	✓	✓			✓		✓
Key events		✓		✓		✓	
Topographical information				✓		✓	

6.1.2 Online availability

None of the subject guides consulted indicated what material was available online, apart from The National Archives' guide for sexuality and gender identity history (which links to digitised records and the 2004 Gender Recognition Act).[14] This was therefore not a common feature. However, there are compelling reasons why this information should be considered

[14] The National Archives, "How to Look for Records of Gay, Lesbian and Bisexual History."

for a subject guide. First, evidence from the National Survey of Visitors to UK Archives shows that increasingly researchers are preparing for their visits using online resources (such as searching the catalogue and online research).[15] It is not yet clear what the longer-term impact the COVID-19 pandemic will have, however it is only likely to increase the use of online means of interacting with and preparing to visit archives. Second, as has been emphasised, environmental researchers are not always experienced archive users and are likely to be drawing from a range of source materials, both archival and non-archival. Any guidance that eases planning of research trips will be of most use to less experienced archive users.

Indicating online availability is not limited solely to digitised material or material that is born-digital. As previously discussed (5.2 Historic Flooding and Drought in Staffordshire), for some research purposes the archive catalogue itself may provide the data that a researcher seeks.[16] If there is material which might be used in this way (as with the Quarter Sessions in this thesis), highlighting this possibility may be relevant, although this can be integrated into description of material rather than separately (as with the Quarter Sessions in Appendix V). Alternatively, if data from the archive has been used in creating a dataset or in a collaboration with substantial online presence (e.g. *TEMPEST*[17]), these might be a valuable tool for a researcher.

6.1.3 Searching the catalogue

Very few of the subject guides consulted contained advice on searching the catalogue specific to the subject. The best and most helpful example that did was the guide for sexuality and gender identity history by The National Archives,[18] which includes general advice on the catalogue, the letter codes for key departments that may be useful to search, lists of historical terminology, and a note on Discovery's system of tagging and taxonomy. Some of these points will be more relevant to the environment than others. As has been previously discussed, the environment is intrinsic to many records and records used to research the environment are usually not "about" the environment. This means that

[15] Cipfa, "Survey of Visitors to UK Archives 2018," 9.
[16] Dunley, "Catalogue as Data: The Basics."
[17] "TEMPEST Database - The University of Nottingham."
[18] The National Archives, "How to Look for Records of Gay, Lesbian and Bisexual History."

although advice on terminology is recommended, it more important to provide guidance that might help locate material that would not readily be found by searching for environment related keywords. Some of this will be provided when recommending material, but it can also be helpful to give some advice on the search functionality of the catalogue.

The language used to describe the environment has changed, and researchers often need to use a variety of search terms to find information (Chapter 5). It may be helpful to suggest terms or techniques that will help produce search results. This might be suggestions of language (particularly if local dialect or variant spellings might be a factor), or it might be that other approaches can be suggested (such as this thesis searching for mills and bridges to find flood events). Another means of accessing environmental data is via place names. Horovitz's work on Staffordshire place names includes a list of common elements, which often contain possible indications about the landscape, such as *cliff* (cliff/bank), *dun/don/donne* (hill), *hol/hall* (hole).[19] Although place names can be a topic for research in themselves,[20] they might also suggest potential case study areas, as with Hopwas in Staffordshire (2.2.2 Quarter Sessions and Assizes). It may also be that there are places that are worth highlighting based on knowledge of the area (particularly for local record offices), such as places prone to frequent flooding.

A factor to consider when creating this advice is the search functionality of the catalogue and the user interface. In the case of the example given of "-was," this advice was not included in the example guide due to the high number of irrelevant results (Appendix V). If the repository uses indexing and it is possible for the user to search using index terms, then listing useful terms from the index may also be helpful. If the user interface supports wildcard searching, this would be particularly useful to highlight as it would allow a researcher searching "flood*" to also find "floods," "flooded," "flooding," et cetera

6.1.4 Material

When recommending material, it is important to explain what the records are, which may include describing the purpose for which they were created and their provenance. It is most

[19] Horovitz, "A Survey and Analysis of the Place-Names of Staffordshire, Vol. 1."
[20] Jones, "Responding to Modern Flooding: Old English Place-Names as a Repository of Traditional Ecological Knowledge."

helpful if this can be kept brief and straightforward, but link to other guides and resources (such as more in-depth guides for specific record types). It is also useful to specify the timeframe that the records cover and remember that many environmental researchers will be interested in material that is comparable over a long period, so may prefer long series of records. The guide for sexuality and gender identity history included a note on data protection issues present for some of the records,[21] however none of the environmental guides did. Nevertheless, there is the potential for records to contain both environmental information and information subject to data protection regulations, and this will be worth identifying if it is relevant.

This guidance is recommending the types of information a subject guide for the environment should include and suggests that the above sections are best placed before discussing potential material to provide an introduction for the researcher. As the types of records of potential use are extremely varied, this guidance will not provide suggestions for material. Instead, it will trust that archivists know their collections best, and this thesis and Appendix IV can provide examples of types of records to consider. This guidance will also not recommend one structure for the suggestion of material over others. There are several possible structures, and which one is most appropriate will depend on the repository's holdings, users, and existing guides:

- **Provenance:** this may seem most natural to the archivist and will fit best with existing archive practice and has been used in Appendix V. However, archival principals will not necessarily be apparent to the users so may not be as natural for a researcher.

- **By theme or topic:** this is common among many research guides held by The National Archives, for instance the Environmental pollution and damage guide includes the following headings:[22]
    - The Royal Commission on Environmental Pollution
    - Specific chemicals and substances
    - Military damage

[21] The National Archives, "How to Look for Records of Gay, Lesbian and Bisexual History."
[22] The National Archives, "Environmental Pollution and Damage."

- Civilian aircraft crashes
- Burial sites
- Mining
- Pesticides
- Radioactive waste
- Waterway pollution
- Legislation on contaminated lands

This approach presumes no prior knowledge about the archive or records on the part of the researcher, although it would be restricted to the topics and interests anticipated by the archivist. It also risks being repetitive if records are useful for multiple topics (the variety of events recorded by Parish Registers are one example).

- **Specific events, places or individuals:** This may be a variant on structuring by theme or topic or it may be a means of highlighting "gem" collections, such as if a repository contains the archive of a noteworthy scientist or other relevant individual, such as the David Edwin Coombe Collection at the University of Bath.[23] This will also be relevant if there is an event or subject that is frequently enquired about and the guide to The Sheffield Flood, 1864 by Sheffield Archives and Local Studies provides an example of a subject guide for a specific event.[24] However, as with organising by themes and topics, this may be restricted to only key collections and others may be overlooked.

- **By timeframe:** As discussed in the introduction of this thesis, periodisation can be problematic in an interdisciplinary field. Additionally, there are many examples of records that can be used to understand environment in periods prior to their creation, such as using archaeological records to examine the far past. However, periodisation may be appropriate depending on the archive and the needs of its users. One possibility is to consider material in terms of instrumental measurement

[23] University of Bath, "David Edwin Coombe Collection," accessed July 16, 2020, https://www.bath.ac.uk/corporate-information/david-edwin-coombe-collection/.
[24] Sheffield Libraries Archives and Information, "Sources for the Study of The Sheffield Flood 1864."

and pre-instrumental records (which has been the case in this thesis). A repository may therefore choose the beginning of instrumental measurement in their holdings as one means of structuring material. There may be other significant dates or events, such as major rebuilding or landscaping works that could also mark a timeframe.

6.1.5 Further reading or resources for the researcher

As a subject guide for the environment should support researchers with little to no prior experience of archive use, it would be useful to indicate what other resources might be useful for a researcher. These may not necessarily be directly related to the environment but could support research in other ways. This might include information on the local area or local history, help with source interpretation, or direct researchers to other research resources.

Possible resources to consider include:

- Other research guides, particularly any for material that has been suggested or potentially related topics, for instance gardening or local history
- Reference resources in the archive reading room
- Related material in other repositories, such as how the relevant Assize records held in The National Archives were used in this thesis to complement the Quarter Sessions records.
- Any other useful reference resources or possible reading

7 : Collaborative volunteer projects at the Staffordshire Record Office

> This project [Flooding and Drought] is important for the SRO as the way it is run is a new development for them. This style of working will be more important in the future as the SRO is encouraged by the HLF to have more community engagement with fewer staff.[1]

This comment was made by one of the volunteers working with the *Historic Flooding and Drought* project. The volunteer had been involved in previous projects at the record office for substantially over a decade and reported being chairman of the Friends of the Staffordshire and Stoke on Trent Archive Service (FoSSA) and on the committee of the Staffordshire Archaeology and History Society. This volunteer represents the kind of "expert" volunteer described by Caroline Williams,[2] and was very familiar with the record office, its collections, processes, and service. They therefore provide a very valuable insight into the impact of collaborative projects on the archive service.

Chapter 5 made several recommendations for resolving access problems for environmental research. Catalogue enhancement was suggested as a potential solution to the access problems identified, but the scale of such projects remains daunting. This chapter will explore one possible means of achieving these recommendations, through collaborative volunteer projects. Staffordshire Record Office undertook such a project between May 2017 and September 2018, led by two PhD students, using volunteers, and based on the 'Revisiting Archives Collections' methodology,[3] which offered the opportunity to test this approach. Although the volunteer project *Historic Flooding and Drought in Staffordshire* was not planned as a piece of action research and therefore the associated reflective mechanisms were not incorporated from the start, in retrospect it will be used as a springboard for discussion of whether and how similar projects can be used to support environmental research. Its results in terms of improved intellectual access have been discussed in Chapter 5; the present chapter aims to evaluate the project according to other

[1] Response to survey of Staffordshire Record Office volunteers, survey questions in Appendix VII.
[2] Williams, "The Impact of Volunteering in Archives," 8.
[3] Bott et al., "Revisiting Archive Collections: A Toolkit for Capturing and Sharing Multiple Perspectives on Archive Collections"; Jon Newman, "Revisiting Archive Collections: Developing Models for Participatory Cataloguing," *Journal of the Society of Archivists* 33, no. 1 (April 2012): 57–73.

criteria, by comparing it with other volunteer projects at Staffordshire and wider research on archive volunteers and by examining the role played by collaborations between archive services and HEIs. The outcomes of the project were not entirely as expected, particularly with regards to catalogue enhancement, so this chapter will also examine other benefits of such projects beyond catalogue enhancement.

Collaborative projects are not new and bring benefits to both the archive and the collaborating partner, particularly by building connections and relationships across sectors.[4] Guidance on the academic-archivist relationship has been produced by Alix R. Green and Erin Lee.[5] Their guidance is too recent to have influenced the *Historic Flooding and Drought* project. However, their urging for an ongoing conversation between archivist and academic, recognition of each other's professional structures and expertise and a flexibility towards change ring very true for *Historic Flooding and Drought.* The project was not entirely as expected, but did produce an interesting challenge for the volunteers, unique research and benefitted the record office.

The Staffordshire Record Office regularly hosts volunteer projects that are collaborations with higher education institutions, and there were several running during the same period as *Flooding and Drought*. However, these projects have usually been collaborations with history departments or historians and working with a geography department was new for the record office. After the conclusion of the *Flooding and Drought* project, a semi-structured interview was held with an archivist from the Staffordshire Record Office who had guided the researchers in coordinating the project. When asked why the record office pursued collaborations with HEIs, she described three main reasons. Firstly, they already had developed relationships with academics, and they wished to formalise these arrangements and make them more planned. Secondly, by collaborating (and jointly applying for funding), the record office can pursue bigger, more meaningful projects, saying:

[4] Evans and Wyn Simpson, "Assessing the Impact of Collections-Based Collaboration across Archives and Academia: The Penrhyn Estate Archive."
[5] Alix R Green and Erin Lee, "From Transaction to Collaboration: Redefining the Academic-Archivist Relationship in Business Collections," *Archives and Records* 41, no. 1 (2020): 32–51.

> We hoped to be able to sort of punch above our weight. We have a small staff but working in partnership with universities means we can take on more adventurous projects, which not only enhances our reputation within our organisation, which is actually quite an important thing for us, but it also means that we can build on relationships to reach out and get new ones.[6]

By being able to demonstrate the value of potential projects, being a trusted partner, and by being able to apply for funding jointly, the record office can take on projects beyond their usual scope (Appendix VI). Finally, academics as project coordinators give volunteers a sustained period with someone with expertise and enthusiasm for the volunteers' work. While there is work required on the part of the archivists in setting up projects, the collaborating researchers can provide most of the time needed to run the project and supervise and guide the volunteers. The archivist made specific reference to one of the *Flooding and Drought* volunteers, describing him as "somebody who had a strong skillset, but just needed something to do with it, which is what you gave him."

Projects such as *Flooding and Drought* run as a collaboration do not function in the same way as projects run by an archive alone. Lindsay notes that any arrangement between volunteers and an organisation must benefit both parties.[7] However, a collaboration with an HEI involves a further party. This affects the activities which are appropriate for the project and sometimes limits what is possible, while bringing the benefit of the perspective of the researcher or HEI and their experience to the project. The project coordinator has their own research goals as well as requirements from their home organisation or funding body. This is likely to include research outputs such as publications but can also involve public outreach. There may also be time constraints on a collaboration as the researcher or the HEI might have their own deadlines to adhere to. As the Flooding and Drought project was coordinated by two doctoral students, it needed to produce material for their theses and be completed within the timeframe of a PhD (including planning beforehand and writing afterwards). Such projects bring with them the priorities and perspectives of the collaborating organisation or individuals.

[6] Appendix VI.
[7] Helen Lindsay, "Volunteering in Collections Care: Best Practice Guide," 2011, www.collectionslink.org.uk.

Researchers from environmental sciences may be more used to the similar methodologies involved in citizen science than with archive volunteers. Developments in citizen science in recent years offer exciting and new means of data collection and transcription of material.[8] The use of citizen science has developed to help produce the data needed for many projects and databases. The term was first coined in 1994 to describe the use of expertise by lay people,[9] and during the 2010s there was a dramatic increase in the use of public engagement in scientific research, with participants contributing their intellectual effort, wider knowledge, or their tools and resources.[10] Although biology has dominated citizen science, environmental research has also increasingly made use of citizen science methods.[11] Many databases, such as ACRE and the Old Weather project, have relied on citizen science to gather or transcribe records.[12] Zooniverse has provided a platform for citizen science projects, such as the *Weather Rescue* project which successfully resulted in the transcription of around 52,000 columns of data from records taken on Ben Nevis between 1883 and 1904[13] followed by *Rainfall Rescue,* which was launched on the twenty-fifth of March 2020 and received publicity from BBC,[14] and more recently a similar project, was launched, *UK Tides*.[15] In less than three weeks of *Rainfall Rescue*, there had been 65,000 pages, 16,000 volunteers and 5.25 million observations recorded (though it should be noted that this was under the extraordinary circumstances of the COVID-19 lockdown).[16]

[8] Riemann et al., "The CRE Tambora.Org - New Data and Tools for Collaborative Research in Climate and Environmental History."
[9] Ria Follett and Vladimir Strezov, "An Analysis of Citizen Science Based Research: Usage and Publication Patterns," *PLoS One* 10, no. 11 (2015).
[10] Follett and Strezov.
[11] Follett and Strezov.
[12] Allan et al., "Toward Integrated Historical Climate Research: The Example of Atmospheric Circulation Reconstructions over the Earth."
[13] Stephen Burt and Ed Hawkins, "Near-Zero Humidities on Ben Nevis, Scotland, Revealed by Pioneering 19th-Century Observers and Modern Volunteers," *International Journal of Climatology* 39, no. 11 (September 1, 2019): 4451–66.
[14] Ed Hawkins and Steven Burt, "Rainfall Rescue — Zooniverse," accessed March 26, 2020, https://www.zooniverse.org/projects/edh/rainfall-rescue; Ed Hawkins, "Launching Rainfall Rescue » Talk — Zooniverse," 2020, https://www.zooniverse.org/projects/edh/rainfall-rescue/talk/3143/1295011; Jonathan Amos, "Help Needed to Rescue UK's Old Rainfall Records - BBC News," March 26, 2020, https://www.bbc.co.uk/news/science-environment-52040822?fbclid=IwAR0YVQstZ3VEE5ET-tMKpKTrFhpBQr1wjAptuCoferR7U0Upm-aD2g_Pf1w.
[15] Andy Matthews, Liz Bradshaw, and Joanne Williams, "UK Tides — Zooniverse," accessed January 29, 2021, https://www.zooniverse.org/projects/psmsl/uk-tides.
[16] Hawkins and Burt, "Rainfall Rescue — Zooniverse."

The Staffordshire Record Office has not usually used remote volunteering, with volunteers generally working in small groups within the archive. The social aspect of volunteering is important for many of their volunteers,[17] and the primary responsibility of the record office as a local authority archive is to local communities. In-person volunteering has usually been most in-line with the goals of both the record office and the volunteers. In contrast, volunteers for online projects such as *Old Weather*[18] or through Zooniverse might never meet in person with each other or the project coordinator, although the online communities can be very active. During interview, the archivist from the Staffordshire Record Office said that as volunteers could not visit the Record Office during the COVID-19 lockdown, they were developing remote learning and volunteering opportunities. At the time of writing, it is too soon to know how archive volunteering will be affected long-term, and if similar methodologies will become more common for archives. They are already being used by plenty of projects elsewhere, such as with transcription for the Bentham project at University College London,[19] and with the Cheshire Tithe Maps project.[20] The *Flooding and Drought* project attracted a total of nine volunteers, with approximately five attending each week. In contrast, online projects are often able to attract thousands of volunteers. Even if individually the volunteers contribute less time, the outcomes can be far greater if the resources are available for online projects and may be a direction for more record offices to investigate in the future.

7.1 Staffordshire Record Office Volunteers

Chapter 5 drew on the experiences of archivists and the academic community. These will be important here, but in discussing a volunteer project it is necessary to also consider the volunteers. Volunteers are not simply a means to undertake research, they will have their

[17] Williams, "The Impact of Volunteering in Archives," 4–6; Appendix VII.
[18] Philip Brohan et al., "Marine Observations of Old Weather," *Bulletin of the American Meteorological Society* 90, no. 2 (2009): 219–30; "Old Weather," accessed August 24, 2020, https://www.oldweather.org/.
[19] University College London, "Bentham Project," accessed October 22, 2020, https://www.ucl.ac.uk/bentham-project/.
[20] Cheshire Archives and Local Studies, "Cheshire Tithe Maps Online," accessed October 22, 2020, https://maps.cheshireeast.gov.uk/tithemaps/.

own motivations for volunteering, and it is important that a project benefits the volunteers as well as the researchers and the archive. It is therefore necessary to establish some details about the volunteers and why they volunteer. Working with groups of volunteers has many benefits for an archive: it allows them to do things they would not normally be able to and promotes user engagement.[21] Archives have always benefitted from volunteer labour but in recent decades the relationship with volunteers has taken on added significance with emphasis by funders on community involvement and skills development on the one hand and need to demonstrate to parent organisations best value in a time of austerity on the other.

Archive volunteers have been studied, although not in relation to specific research interests. Williams' 2014 report to the Archives and Records Association (ARA)[22] provides data on volunteers, focusing on how volunteering is managed, while her 2018[23] report analyses existing data and examines the impact of volunteering, using eighty-three case studies (mostly local authority). Earlier work by Louise Ray in 2009 for the National Council on Archives (whose responsibilities passed to the Archives and Records Association and The National Archives) provides similar data on volunteers to Williams', so can be used to establish any changes in volunteering in the last decade.[24] As bodies with a vested interest in ensuring volunteering is well managed, the ARA and TNA have both produced statements and advice on archive volunteering.[25] TNA published its own guidance on volunteer cataloguing.[26] Meanwhile Lindsay has produced a "Best Practice Guide" on volunteering in collection care on behalf of the ARA.[27] While Williams discusses the motivations of volunteers, there is little work on the loyalty of volunteers towards the archive and what

[21] Williams, "Managing Volunteering in Archives: Report," 11; Steven Howlett, Joanna Machin, and Gertrud Malmersjo, "Volunteering in Museums, Libraries and Archives," 2005, 12, http://www.volunteerspirit.org/files/volunteer_survey_2006_9500.pdf.
[22] Williams, "Managing Volunteering in Archives: Report."
[23] Williams, "The Impact of Volunteering in Archives."
[24] Louise Ray, "Volunteering in Archives: A Report for the National Council on Archives," 2009, http://webarchive.nationalarchives.gov.uk/20120215211544/http://research.mla.gov.uk/evidence/documents/volunteering-in-archives-nca.pdf.
[25] The National Archives, "Volunteering at The National Archives: The National Archives' Approach to User Participation," accessed April 18, 2018, http://www.nationalarchives.gov.uk/documents/volunteering-at-the-national-archives.pdf.
[26] Kevin Bolton and Sue Mckenzie, "Guidance for Volunteer Cataloguing in Archives," 2017, http://nationalarchives.gov.uk/doc/open-government-licence/version/3.
[27] Lindsay, "Volunteering in Collections Care: Best Practice Guide."

motivates volunteers to continue volunteering, which is a point that will be raised in this chapter. There is work on volunteer satisfaction and loyalty in libraries by Dong-Geun Oh,[28] and literature on volunteering in other sectors suggest broad similarities between the motivations of volunteers in museums, libraries and archives[29] (indeed, they have been analysed side by side[30]).

The Staffordshire and Stoke on Trent Archive Service's annual reports provide lists of names, volunteer hours recorded and description of projects.[31] However there is no other available data that would help understand the motivations and loyalty of these volunteers. The reports provide numbers of volunteers, but do not reflect the experiences of the volunteers. The Survey of visitors to UK Archives provides data on archive users and could provide a comparison if equivalent data on volunteers existed, and experience from the *Flooding and Drought* project suggested that at the Staffordshire Record Office there was likely to be considerable overlap between users and volunteers. Data for individual repositories is not published separately, but data for 2016 from the Staffordshire Record Office was made available for the purposes of this study.

To resolve the absence of volunteer data, a survey ran between June and September 2018 to produce data on Staffordshire Record Office volunteers from across different projects and gather a sample of volunteers' opinions and experiences. The survey was run for a

[28] Dong-Geun Oh, "Analysis of the Factors Affecting Volunteering, Satisfaction, Continuation Will, and Loyalty for Public Library Volunteers: An Integrated Structural Equation Model," *Journal of Librarianship and Information Science* 51, no. 4 (2017): 894–914.
[29] Howlett, Machin, and Malmersjo, "Volunteering in Museums, Libraries and Archives"; Robert A. Stebbins, *Leisure and the Motive to Volunteer* (Basingstoke: Palgrave Macmillan, 2015); Margaret Deery, Leo Jago, and Judith Mair, "Volunteering for Museums: The Variation in Motives across Volunteer Age Groups," *Curator: The Museum Journal* 54, no. 3 (2011): 313–25; Steven Rhoden, Elizabeth M Ineson, and Rita Ralston, "Volunteer Motivation in Heritage Railways: A Study of the West Somerset Railway Volunteers," *Journal of Heritage Tourism* 4, no. 1 (2009): 19–36.
[30] Howlett, Machin, and Malmersjo, "Volunteering in Museums, Libraries and Archives"; Zelmarie Cantillon and Sarah Baker, "Serious Leisure and the DIY Approach to Heritage: Considering the Costs of Career Volunteering in Community Archives and Museums," *Leisure Studies* 39, no. 2 (2019).
[31] Staffordshire and Stoke on Trent Archive Service, "Annual Report 2016/2017," 2017, https://www.staffordshire.gov.uk/leisure/archives/about/AnnualReport/Annual-Report-2016-17.pdf; Staffordshire and Stoke on Trent Archive Service, "Annual Report 2017 - 2018," 2018, https://www.staffordshire.gov.uk/leisure/archives/about/AnnualReport/Annual-Report-2017-2018.pdf; Staffordshire and Stoke on Trent Archive Service, "Annual Report 2018 - 2019," 2019, https://www.staffordshire.gov.uk/Heritage-and-archives/Documents/Annual-Report-Final-2018-19-web.pdf.

relatively long period in the hope that as many volunteers could be reached as possible. The number of survey responses for the Archive Service is quite small, for the 2016 Public Services Quality Group (PSQG) survey of visitors they received sixty-nine responses, and the volunteers survey conducted for this project received thirty-two (based on numbers of volunteers listed in annual reports, this represents twenty to thirty per cent of the archive service's volunteers). [32] There is always the possibility that this sample is not representative, however the apparent high rates of regular users of the archive service still indicates a great level of involvement in the local community by the archive.

The volunteer survey consisted of three sections. The first was designed to establish their volunteering history and habits, asking the volunteers to list the projects they were part of, that they had previously been part of, how long they have volunteered for and whether they volunteer for other heritage or cultural organisations. The second section aimed to understand their experience of volunteering and asked if they had visited the record office before volunteering, whether they consider themselves a regular archive user, why they volunteer, what benefits they have experienced from volunteering, whether they feel valued as volunteers (and why), whether volunteering had changed their perception of Staffordshire's history and whether they were likely to volunteer for the record office again. The final section consisted of some basic demographic questions. On the basis that there is likely to be an overlap between archive users and archive volunteers, questions were modelled to be similar to the Survey of Visitors to UK Archives by the Archives and Records Association National Surveys Group (previously the PSQG).[33]

The Staffordshire and Stoke on Trent Archive Service Annual report for 2016-2017 lists 124 volunteers across the whole service, 109 for 2017-18 and 155 for 2018- 2019 as well as over 8,500 volunteer hours each year.[34] This means that on average each volunteer provides the Archive Service with between fifty and eighty hours of assistance per year. This is high

[32] Staffordshire and Stoke on Trent Archive Service, "Annual Report 2017 - 2018"; Staffordshire and Stoke on Trent Archive Service, "Annual Report 2016/2017"; Staffordshire and Stoke on Trent Archive Service, "Annual Report 2018 - 2019."
[33] Cipfa, "Survey of Visitors to UK Archives 2014."
[34] Staffordshire and Stoke on Trent Archive Service, "Annual Report 2017 - 2018"; Staffordshire and Stoke on Trent Archive Service, "Annual Report 2016/2017"; Staffordshire and Stoke on Trent Archive Service, "Annual Report 2018 - 2019."

compared to other archives, but not altogether unusual for a local record office.[35] As volunteer hours are likely to be under-reported, it is possible that the real numbers are even higher. Due to the nature of volunteer work as less formal than paid employment, recording of volunteering during project sessions is not likely to be consistent. Even if recording of sessions were consistent, the contributions of volunteers outside the session times are rarely, if ever, recorded. Regardless of potential unrecorded hours, the time volunteers give to the archive service represents more than four full-time workers. Although volunteers cannot and should not replace the duties of paid, trained staff, the hours they give are an incredibly valuable resource for the archive service. They also provide researchers with the opportunity to access assistance from an experienced and dedicated body of volunteers. This strong culture of volunteering at the record office was extremely beneficial to the *Flooding and Drought* project as it meant there was an existing pool of experienced, enthusiastic volunteers from whom several of the *Flooding and Drought* volunteers were recruited.

The results of the survey of volunteers suggest that Staffordshire Record Office volunteers might be considered typical of a local archive, but the findings may not be as applicable for a project working in a different setting. For example, volunteers seeking work experience may have different skills, experience, or available time to retirees. All Staffordshire Record Office volunteers who were willing to state their ethnicity said they were white, consistent with Williams' finding of ninety-seven per cent white volunteers.[36] The gender ratio is also completely typical, almost exactly fitting Williams' findings of sixty-three per cent female to thirty-seven per cent male,[37] with the Staffordshire Record Office producing findings of sixty-three per cent and thirty-eight per cent (once rounded to the nearest whole). In 2009, Ray established that most archive volunteers were between fifty-five and seventy-four years old.[38] However, in 2014 Williams found that although this was still true, fifty-nine per cent of volunteers were over fifty-five, lower than Ray's sixty-seven per cent.[39] The age profile of Staffordshire Record Office's volunteers leans even more heavily towards the older end of the spectrum than either Ray or Williams' studies, with around ninety-six per

[35] Williams, "The Impact of Volunteering in Archives," 12.
[36] Williams, "Managing Volunteering in Archives: Report," 13; Appendix VII.
[37] Williams, 13; Appendix VII.
[38] Ray, "Volunteering in Archives: A Report for the National Council on Archives," 4.
[39] Williams, "Managing Volunteering in Archives: Report," 13.

cent of volunteers being over fifty-five,[40] and both the median and modal ages for the volunteers surveyed was seventy-one (one volunteer below the age of twenty-five is likely to skew the mean).

Of volunteers at the Staffordshire Record Office surveyed, sixty-two per cent had visited the Record Office prior to volunteering, and half of the volunteers reported having been involved with previous projects.[41] Meanwhile, the majority of volunteers reported hearing about their projects through means that are more likely to reach people who are already familiar with the Record Office, such as word of mouth or the Archive and Heritage Service email newsletter.[42] Therefore, the record office's volunteers are likely to substantially overlap with the record office's users. Responses to the National Survey of Visitors to UK Archives since 2014 have consistently reported between seventeen and eighteen per cent first time archive users.[43] The results for the Staffordshire and Stoke-on-Trent Archive Service show much lower rates of first-time archive users, with only nine per cent of responses indicating no prior archive experience. In addition, fifty-seven percent of the Staffordshire and Stoke-on-Trent Archive Service's users consider themselves to be regular users of the archive service.

The Staffordshire Record Office volunteers can therefore be characterised as predominately of retirement age, with many of them being loyal, regular volunteers who are highly skilled. This is likely to be reflected in the motivations of volunteers, who are significantly less likely to be seeking employability skills or work experience, and more likely to be seeking to volunteer for enjoyment. Chapter 5 discussed the experience of a *Flooding and Drought* volunteer being an informal finding aid, and the data from the volunteers suggests that this individual was not unusual. While a similar project should not depend on attracting volunteers with this level of experience and skill, these volunteers can be considered a very likely benefit to a collaborative project with a local record office.

[40] Appendix VII.
[41] Appendix VI.
[42] Appendix VI.
[43] Cipfa, "Survey of Visitors to UK Archives 2014"; Cipfa, "Survey of Visitors to UK Archives 2016"; Cipfa, "Survey of Visitors to UK Archives 2018."

7.2 Flooding and Drought

As part of the *Flooding and Drought* project, volunteers were used in several ways:

- Transcription of mill accounts and relevant sections of records
- Basic data analysis (e.g. recording grain sales, mill expenses and repairs or terms of leases into a pre-formatted spreadsheet)
- Assistance with catalogue enhancement by recording information that could be used to improve catalogue description or add index terms to catalogue entries (whether in a spreadsheet, a paper form, or annotations on a printed copy of the existing catalogue entry)

The larger portion of volunteers examined diaries from the late eighteenth and nineteenth centuries as it was possible to identify diaries spanning a long, continuous period, and only two volunteers were involved in the nominally named "flood" half of the project. Nonetheless, these two volunteers, working with title deeds and mill accounts, were able to examine more material than a researcher could alone in the same timeframe. The volunteer examining title deeds provided substantially over one hundred hours to the project and consulted over two hundred documents. The volunteer in question often continued working on material outside the project sessions, often by consulting documents at the record office, but also by taking photographs to examine later or pursuing research to understand more about the records being examined. For example, it was this volunteer who discovered that one clause in a lease from the crown in 1587[44] had a very similar maintenance clause (barring references to water) to one identified by Bagnall in the Augmentation Office Records (3.2.3 Maintenance clauses).[45] He was not the only volunteer to give time to the project beyond its "official" hours – some of the volunteers examining diaries continued after the project had ended, emailing the coordinators with updates.

Several of the volunteers on the *Flooding and Drought* project had been part of previous projects for the Staffordshire Record Office (including two members of the Friends of the

[44] SRO D(W)1734/J/1614.
[45] Bagnall, *A History of Wednesbury, in the County of Stafford*, 158.

Staffordshire and Stoke on Trent Archive Service). Among the first-time volunteers one signed onto another project running in the afternoons of the same day as the *Flooding and Drought* project, and several more enquired about further volunteering opportunities, indicating that the new volunteers that *Flooding and Drought* attracted may in time become regular and highly skilled volunteers. As Williams notes, retirees (who most Staffordshire Record Office volunteers are), often bring highly detailed knowledge of the organisation they involve themselves with.[46] Williams frames this as a benefit to an archive team, however this can be even more useful to a project coordinator on a collaborative project. Although over ninety per cent of the Staffordshire Record Office catalogue is now online, there is still material that is still best found through the paper catalogue (which is more challenging and time consuming to search). The volunteer engaged in examining title deeds had volunteered with the record office for fourteen years and had previously worked with deeds, so was able to find documents that had not been identified when creating the initial list for him to consult. He also was able to contribute his own knowledge of Staffordshire's history to the project, possessing a detailed knowledge of the county's geography, landmarks, and the landowning families (among many other topics).

By the end of the *Historic Flooding and Drought* project, the entirety of the Burton-on-Trent mill accounts had been transcribed and converted into a spreadsheet of usable data, over two hundred and six title deeds over seventy years of diary entries and miscellaneous other documents had been examined. The former two, mill accounts and leases, provided most of the data that was used in Chapter 3. After formatting and checking the spreadsheets of mill accounts and diary entries, the files were transferred to the Staffordshire Record Office. Catalogue entries for relevant records were updated and the index terms for flooding and types of mill were added to catalogue entries for records that had been examined. In addition, four bundles of deeds were identified for property in the manor of Cannock and Rugeley that had very poor existing cataloguing, [47] which may be legacy data originating with the accession of the deeds in 1953.[48] These bundles were re-catalogued as part of the project in a manner consistent with both ISAD (G) and the rest of the collection and series to which they belong.

[46] Williams, "The Impact of Volunteering in Archives," 9.
[47] SRO D260/M/T/4/20-23.
[48] Staffordshire Record Office accessions register.

7.3 Challenges: Catalogue enhancement

During the *Flooding and Drought* project, the work undertaken by the volunteers contributed to catalogue improvement and indexing for the archive as well as to doctoral research by the two project coordinators. Many archival processes can be slow, archives often have a substantial backlog of material, and in 2003 the logjam audit recorded that twenty-nine per cent of archives in the North-West remained inaccessible.[49] The recent emphasis has been on improved access for the archive user,[50] and to facilitate making archive material available efficiently, the need to catalogue to item level has been challenged with the call for More Product, Less Process (MPLP) by Greene and Meissner.[51] This approach has been adopted by many archives to tackle backlogs of unprocessed (and therefore inaccessible) material.[52] In addition to any backlog, a record office such as the SRO has legacy data to contend with, which is not always fit for purpose. When *Gateway to the Past* was created, the priority was to input as much of the paper catalogue as possible to make it available online, and much of this data was retained rather than improved.

Adapting to changing research interests can therefore be challenging when access needs to be prioritised. In Chapter 5 it was noted that many of the repositories surveyed had ongoing cataloguing work, and if these repositories are not aware of many researchers interested in the environment, they cannot necessarily be expected to devote much time and resources to something that may be seen as a marginal interest. It has been noted that the use of volunteers can provide a solution to some issues with MPLP, providing the ability to capture details while streamlining the work of the archivist, who continue to make collections and series-level description.[53] As was noticed when examining the cataloguing for the Quarter Sessions and during *Flooding and Drought*, volunteers are often very

[49] Greene and Meissner, "More Product, Less Process: Revamping Traditional Archival Processing," 210; Tullock and Cave, "Logjam: An Audit of Uncatalogued Collections in the North West."
[50] Greene and Meissner, "More Product, Less Process: Revamping Traditional Archival Processing," 212.
[51] Greene and Meissner, "More Product, Less Process: Revamping Traditional Archival Processing"; Meissner and Greene, "More Application While Less Appreciation: The Adopters and Antagonists of MPLP."
[52] Explore York Archives Service, "MPLP," York: A City Making History, 2012, https://citymakinghistory.wordpress.com/the-project/mplp/.
[53] Jane Stevenson, "More Product, Less Processing? – Archives Hub Blog," 2012, http://blog.archiveshub.jisc.ac.uk/2012/01/05/more-product-less-processing/.

inquisitive and can pay attention to details that an archivist may not be in a position to linger over. The volunteer-based catalogue-enhancement for the Quarter Sessions was very beneficial for this thesis, even though it was not created with environmental research in mind. Volunteer catalogue enhancement can potentially provide a middle ground between MPLP and volunteer cataloguing: the archivist can provide the bare bones of the catalogue and ensure archival principles are followed, while the volunteers can fill in details to provide greater accessibility.

Flooding and Drought provided some catalogue enhancement for the Staffordshire Record Office, but not entirely in ways that were expected. [54] One unexpected example noted in interview with a record office archivist was that "we got a load of quite poorly described deeds described really well! And we weren't anticipating that at all!"[55] However, *Flooding and Drought* did not result in the level of catalogue enhancement that was hoped. The project had been intended to achieve this through the means of a volunteer project, however when interviewed, an archivist from the record office observed that these two strands "swapped emphasis," saying that:

> it has been an interesting project, a good project. But it didn't turn out to be what I expected it to be. It became, our main focus, our benefit for us, and a really good benefit, was a great volunteer project, which the volunteers enjoyed.[56]

One reason for this is the thematic nature of *Flooding and Drought*. Williams identifies several different types of volunteer project that archives can run, which carry different benefits for an archive (Table 7.1).[57] *Flooding and Drought* fits the characteristics of the named or thematic projects that Williams describes. Thematic projects are also usually the result of collaborations with external partners, as with *Flooding and Drought* with the University of Liverpool or *The Staffordshire Place-Name Project* with The Institute for Name-Studies at the University of Nottingham. Material was selected around a research theme rather than from one archive group, fonds, or series, and it was limited by the duration of a PhD programme. The activities of the volunteers were varied, including

[54] Appendix VI.
[55] Appendix VI.
[56] Appendix VI.
[57] Williams, "Managing Volunteering in Archives: Report."

recording data and transcription. Because of selecting material based on a theme, which might be scattered, thematic projects are better suited to cross-cutting approaches, and less suited to systematic archive work. They are also more likely to be time-limited (as *Flooding and Drought* was) so cannot continue indefinitely to ensure completion of cataloguing (as with the Quarter Sessions project).

Table 7.1: Examples of Staffordshire Record Office projects that match types identified by Williams.

Project types identified by Williams	**Examples from the Staffordshire Record Office at the time of *Flooding and Drought*[58]**
Cataloguing specific archive groups or fonds	Sutherland Papers project
Named and thematic projects (with archives drawn from more than one source) and probably time limited	*Place-Names, Flooding and Drought,* Victoria County History research, *The Chase Through Time*
Cataloguing archive series	Quarter Sessions
Physical (relocation, conservation, preservation, digitisation)	Preservation and digitisation volunteers
Indexing	Magistrates records, wills, marriage bonds, various WWI records
Transcription	Gothard diaries

In interview, the archivist described further reasons for the volunteer project becoming more important than the cataloguing. She explained that the material that the Record Office holds was very useful but did not fully match the expectations of the University of Liverpool. This was partly due to a lack of specific "gem" collections that were readily accessible (and not in Latin). She also mentioned that the researchers became interested in different material than expected, potentially due to these difficulties. However, the lack of catalogue improvement does not necessarily mean similar projects are not valuable. Volunteer groups perform many functions to support archives, and there are other ways in which collaborations can support environmental research.

7.4 Engagement with environmental researchers

Academic researchers are not the only archive users, and account for around a quarter of archive users nationally.[59] The Staffordshire Record Office has a smaller proportion of academic researchers, at only around twelve per cent.[60] The Staffordshire Record Office's

[58] Staffordshire and Stoke on Trent Archive Service, "Annual Report 2017 - 2018."
[59] Cipfa, "Survey of Visitors to UK Archives 2018," 8.
[60] Unpublished survey data provided by the Staffordshire Record Office.

results also recorded no researchers visiting the archive for their work, and a lower number than the national average preparing for a talk or presentation (Table 7.2). Meanwhile, the percentage undertaking family history research is higher than average, and those doing research for an organisation they volunteer for is roughly double the national average. This suggests that in comparison to the national average, the Staffordshire Record Office's users are more likely to be recreational archive users and fewer who would be described by Mortimer as "research officers."[61] This is important for environmental research due to the variety of potential reasons for environmental research. This thesis has most closely examined academic researchers. However, there are many other reasons, whether professional or recreational, that a researcher might be interested in the environment. Therefore, the potential of environmental data in an archive for public outreach or recreational users (including archive volunteers) may be just as, if not more important for the Staffordshire Record Office and similar repositories to consider.

Table 7.2: Reasons for visiting archives recorded by the Survey of Visitors to UK Archives: The Staffordshire Record Office compared to nationally

	SRO	National results		
Why are you visiting this archive today?	**2016**	**2018**	**2016**	**2014**
Academic research	12 %	26 %	21 %	19 %
Architectural / building / site research	12 %	10 %	11 %	8 %
Family history research	49 %	41 %	44%	49%
Military research	4 %	9 %	6 %	7 %
Local history research	29%	30 %	30 %	31 %
General browsing / familiarising myself with the archive	2%	5 %	5 %	5 %
Accompanying a friend / family member who is undertaking research	4%	3 %	4 %	4 %
To find information relating to my work	0	9 %	7 %	8 %
To gather information for a talk / publication / presentation	4%	10 %	9 %	9 %
To find information for the organisation I volunteer at	14%	6 %	7 %	6 %
Am in the area / here on holiday / have time	1%	2 %	2 %	3 %
Other	-	9 %	11 %	10 %

7.4.1 The public

Williams notes that thematic projects focus on more cross-cutting approaches and can support strategic and partnership initiatives, as well as being useful for profile-raising, publicity and marketing.[62] With the contemporary relevance of environmental topics, and frequent UK headlines about flooding, environmental projects such as *Flooding and*

[61] Mortimer, "Discriminating Between Readers: The Case for a Policy of Flexibility."
[62] Williams, "Managing Volunteering in Archives: Report," 52.

Drought present an opportunity to showcase the material held by an archive in a new light. The *Flooding and Drought* social media drew some attention, with the project blog receiving 2,212 views from 689 visitors during the seventeen-month run of the project (along with six followers). From the end of the project in September 2018 to December 2019 there were a further 402 views and 177 visitors.[63] These figures do not show whether engagement with the projects online presence came from academic researchers or the general public, or whether many of them were existing users of the archive. However, some of the most frequently viewed posts were the calls for volunteers (after the home page and profiles of each project coordinator). Although the volunteer survey did not seek to establish any evidence of profile-raising, the overwhelmingly positive response and intake of new volunteers in collaborative projects is also suggestive of the role these projects have in raising the record office's profile with the general public. The social media account from the Flooding and Drought project has now been subsumed into the new AHRC project between the University of Liverpool and Staffordshire Record Office (from November 2020), to take advantage of the existing connections and continuity of research themes.[64]

Further evidence of public impact comes from outreach activities. In February 2018 a "study day" was held, which comprised of talks by researchers around the themes of flooding, drought and water (Figure 7.1). Study days on new or different topics can be an opportunity to attract new visitors. The study day for *Historic Flooding and Drought* was fully booked, with the record office keeping a waiting list for places to attend. Attendees included academics, members of the public, and record office volunteers. The Staffordshire Record Office always offers free tickets for their study days to the volunteers, so study days provide a valuable opportunity to offer something back and showcase volunteer achievements as they see their work used and appreciated.

[63] Based on the statistics available through WordPress as the blog admin for floodanddrought.wordpress.com.
[64] "Clandage: Building Climate Resilience (@FloodandDrought) / Twitter," accessed February 1, 2021, https://twitter.com/FloodandDrought.

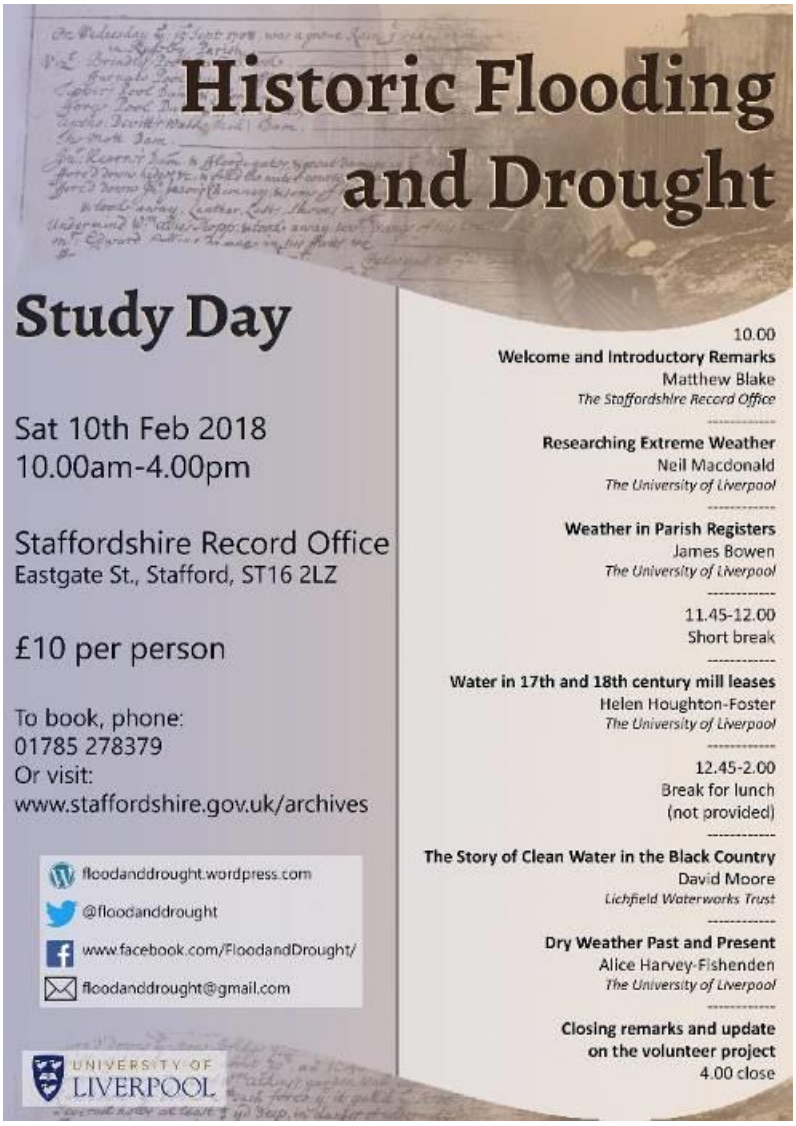


Figure 7.1: Flier advertising the Historic Flooding and Drought study day

Collaborative projects with novel themes, such as the environment, have the potential to widen archive engagement to volunteers or researchers who might not be "typical" archive users, or have previously considered working with an archive. This was explored by Buchanan and Bastian with *Mr Seel's Garden*, which investigated the potential of archives for local food activism,[65] and more recently Annie Tindley et al have examined how collaborative projects using estate records can be a vital resource for local communities.[66]

[65] Buchanan and Bastian, "Activating the Archive: Rethinking the Role of Traditional Archives for Local Activist Projects."
[66] Tindley, Gibbard, and Diamond, "Archived in the Landscape? Community, Family and Partnership: Promoting Heritage and Community Priorities through the Argyll Estate Papers."

Of the six volunteers from *Flooding and Drought* who completed a survey, half had started volunteering with the record office within the last year, a higher proportion than across the service (forty-one per cent). The small number of responses makes this figure unreliable. However, as *Flooding and Drought* was not their only project to collaborate with someone other than academic historians there is further evidence of collaborative projects drawing in new volunteers.

The *Criminal Quilts* project offered a novel variation to many of the projects available with the archive service.[67] It was coordinated by artist Ruth Singer and involved researching women held in Stafford Prison 1877-1916 and creating textile artwork inspired by them.[68] Although all volunteers who completed surveys responded warmly and positively about their experience volunteering, the only one who said they were unlikely to volunteer again (rather than maybe, likely or definitely) was a member of the *Criminal Quilts* project.[69] It seems likely that this is simply because it is a novel project, and the more traditional style of project at the record office may not suit the individual's interests. Partnering with an external organisation and running a project of a different style to usual has the potential to draw in volunteers who may not have considered (or been aware of) volunteering opportunities with an archive service. Four *Criminal Quilts* volunteers completed the survey, of whom three were new to volunteering at the record office (of the whole survey, half had not volunteered before). The *Criminal Quilts* volunteers recorded hearing about the project through Facebook, Twitter, an email from the Wolverhampton School of Art and word of mouth (the latter being an established volunteer). When surveyed, one volunteer from Flooding and Drought reported hearing about the project from the blog, three through the archive service newsletter, two through Twitter and two through word of mouth, reflecting that the project attracted a mixture of existing and new archive volunteers.

[67] Ruth Singer, "Criminal Quilts | Ruth Singer," 2018, https://ruthsinger.com/criminalquilts/.
[68] Ruth Singer.
[69] Appendix VI.

7.4.2 Volunteers: a two-way exchange

As previous guidance on working with volunteers has identified, it is essential that all volunteering projects consider the impact on volunteers, both to ensure that their needs are being met and to demonstrate societal impact for the record office. There has been some work on the "costs" of volunteering on volunteers, including time, hazards and inconvenience,[70] however none of these "costs" were reported by the volunteers surveyed. For example, none of the survey responses appeared to view time spent volunteering as a "cost." Volunteering has a profound and measurable impact on volunteers at the Staffordshire Record Office. Volunteers enjoy working at the record office, or they would not continue to volunteer. All who responded to the survey said they had enjoyed themselves and eighty-four per cent of volunteers recorded having met or socialised with people with similar interests to their own (six per cent answered "not applicable," potentially due to being involved in individual rather than group projects and the rest did not answer).[71] They are also motivated by the gratitude and appreciation of record office staff, and every single volunteer recorded that they felt valued, both because they can see the ways their efforts support the archive service and because they feel appreciated due to verbal thanks as well as mentions in the newsletter, online and at an annual volunteers' event. However, the most frequently mentioned reason that volunteers feel valued is the willingness of record office staff to offer help and advice.[72] The biggest motivation for volunteering is a desire to learn, with over sixty percent of responses indicating that a desire to learn and develop skills, learn more about Staffordshire or because the subject of the project interested them were each reasons for volunteering.

Fulfilling these needs results in loyal volunteers, willing to engage with multiple projects or continue volunteering after their project ends. Around thirty-eight per cent of Staffordshire Record Office volunteers are engaged in more than one project simultaneously.[73] One volunteer from the project, who had not volunteered for the record office before, also

[70] Robert A. Stebbins and Margaret Graham, *Volunteering as Leisure/Leisure as Volunteering: An International Assessment* (Wallingford: CABI Publishing, 2004); Cantillon and Baker, "Serious Leisure and the DIY Approach to Heritage: Considering the Costs of Career Volunteering in Community Archives and Museums."
[71] Appendix VII.
[72] Appendix VII.
[73] Appendix VII.

enrolled on the *Criminal Quilts* project. This enthusiasm speaks to an enjoyment of volunteering with the record office just as much as it reflects the *Flooding and Drought* project. Half of volunteers surveyed had volunteered for at least one project prior to the one they were currently involved with, while ninety-one per cent said they were likely to, or definitely would, volunteer in the future.[74] Among the six *Flooding and Drought* volunteers who completed a survey, four were involved in other current projects, including the *Magistrates Records*, *Criminal Quilts*, and *Parish Rights of Way.* Two of these had also volunteered for prior record office projects, naming eight different projects between them. Responses to open-ended survey questions bear this out, with volunteers expressing a love of volunteering and that they "will continue volunteering for as long as I am able."[75]

Because curiosity and a desire to learn is a strong motivation for volunteer loyalty, volunteers do not just bring their existing skills and knowledge to the Record Office, but also a desire to learn new things. The knowledge transfer happens in both directions: while they contribute to projects, they develop their own skills and knowledge. When surveyed, sixty-six per cent of volunteers expressed a desire to learn new skills or improve existing ones, and eighty-one per cent said they had developed new or existing skills while volunteering.[76] Cultivating relationships with volunteers benefits both the volunteers and the record office. Long-term volunteers and those eager to learn and develop skills that are useful to the archive, such as in conservation or palaeography. For some volunteer groups this becomes an integral part of volunteering, for example the preservation volunteers learn conservation skills and are instructed by the conservation staff.

The benefit to the volunteers is one of the reasons for collaborating on projects that was described by the record office archivist. The archivist observed that the curiosity, existing skills, and intelligence of many of their volunteers meant that:

> …it's good for them to feel stretched by people with their specialist knowledge and also they often, because our volunteers tend to be older, they often come with a very strong set of skills, and it's good to be able to make use of their skills and help them to develop their skills further, and we generally wouldn't have time to do that on our own. But you know that work you did with [name of

[74] Appendix VII.
[75] Appendix VII.
[76] Appendix VII.

> *Flooding and Drought* volunteer], for example, that's somebody who had a strong skillset but just needed something to do with it, which is what you gave him.

Later in the interview, the archivist used the word "stretching" again, in discussion about academic-led projects. It was noted that even if the volunteer activities themselves are straightforward, the volunteers enjoy feeding into a more challenging project and learning about the research. Environmental research projects can have both local relevance as well as a novelty of a new, exciting topic.

In May 2018, Susan Kilby from the University of Leicester ran a series of palaeography sessions for the *Staffordshire Place-Names* project. This has the added benefit of novelty, providing variation from the usual running of projects and making the volunteers feel that their needs are appreciated. There is evidence from the survey conducted that this was greatly appreciated by volunteers who attended, with one response mentioning the sessions as one of the reasons they felt valued as a volunteer. The same respondent specifically indicated that they had developed their palaeography skills in response to the question "What benefits have you experienced from volunteering?" and added a note on the end of their survey, saying, "If you have any trouble with my writing, I am a semi-trained palaeographer and can possibly help you."

Responses such as this display a great deal of gratitude (and wit) towards the Staffordshire Record Office for facilitating their desire to learn. The most common comment given when asked to elaborate on why they felt valued was the helpfulness of record office staff, the word "helpful" was used to describe staff by seven volunteers, and another three mentioned "help" from record office staff.[77] This enthusiasm for learning proved invaluable to the *Flooding and Drought* project. It meant that volunteers not only brought their own knowledge and skills to the project but were also willing to learn and develop with the project, adapting to the project material.

The survey also produced evidence that volunteers enjoy expanding their knowledge of their county and local history, something that a local record office is uniquely able to facilitate. Research projects in particular have the potential to enrich volunteers' local

[77] Appendix VII.

geographical knowledge, particularly if the research is in historical geography such as with the *Place-Names* project or *Flooding and Drought,* with one of the volunteers for the former saying that the project "is enriching my knowledge of my local area."[78] Some volunteers mention particular areas of Staffordshire, with one of the *Victoria County History* volunteers naming Uttoxeter in the north-east, and another mentioning the eastern side of the county.[79] A volunteer from the *Flooding and Drought* project also mentioned being very interested in new water management and agricultural practices on Lord Stafford's estate in the eighteenth century. While being encouraged to examine archive material in new ways, the volunteers also found their own interests reflected in the records. For example, one volunteer examining diaries for weather became very interested in details of eighteenth-century gardening. As observed, the volunteers seem potentially more excited by learning more about the social or environmental history of their county, noting that it was a pleasant change from "kings and earls."[80] Whatever the precise nature of the volunteers' interest in their projects, it is clear that the projects can inspire them to learn more about their area, with one saying that volunteering has "Given me a taste for finding another local project." [81]

7.4.3 The academic community

This project has demonstrated measurable impact on volunteers, but this can be valuable in an academic context. The questions asked of volunteers were not designed to measure this impact in term applicable to the UKRI Research Reference Framework, however the impacts of this project certainly fit the REF definition of impact as 'an effect on, change or benefit to the economy, society, culture, public policy or services, health, the environment or quality of life, beyond academia'.[82]

[78] Appendix VII.
[79] Appendix VII.
[80] Appendix VII.
[81] Appendix VII.
[82] Research England, "REF Impact - Research England," UK Research and Innovation, 2020, https://re.ukri.org/research/ref-impact/.

Formal collaboration with an archive service creates opportunities for research that might not be available to most archive users. In Chapter 5, I discussed how the privileged access provided by collaboration helped to mitigate against some of the common difficulties of archive research and made mention of how an experienced volunteer was able to assist with finding material. However, working with volunteers brings benefits that are particularly useful for environmental research. For a geographical study of a specific area, an intimate knowledge of the area is extremely useful for a researcher. If the researcher does not possess this, volunteers can provide valuable assistance. On the *Flooding and Drought* project, social bonds were formed between researchers and volunteers, and between the researchers and archive staff. This helped foster a sense of familiarity with Staffordshire, even of belonging, that became an unexpected benefit to the research for this thesis.

One of the purposes of surveying the volunteers was to support the coordinators' personal experience of ways in which the volunteers' ties to their local area can be helpful to a researcher. During the *Flooding and Drought* project, the volunteers were often able to bring their own knowledge to the project. For example, the search for mill leases uncovered two plans of the Shugborough estate from the late eighteenth century. The first plan, from circa 1780, has a hole in part of the plan, including part of where the mill pool is (Figure 3.8). There was initially some trouble recognising some of the features on the plan as it was not drawn with much accuracy and the estate landscape has since changed dramatically. However, the volunteer examining leases was very familiar with the estate and was able to instantly identify landmarks such as the Tower of the Winds and the shape of Essex Bridge. The mill pool has since dramatically changed shape, and the Tower is no longer in the water, so the assistance of the volunteer was useful in identifying a landmark which on the plan is marked only with a black circle. Volunteers such as this example have an extensive knowledge of their local area, and while they might not conceptualise it themselves as environmental, it is extremely valuable for a research rooted in the local area.

The biggest benefit to the PhD students of running a volunteer project were the volunteers themselves. The Record Office can attract very highly skilled volunteers as well as enthusiastic new ones. The volunteers on the *Flooding and Drought* project were a mixture of new volunteers (some of whom had never visited the record office before) and established volunteers, who often have been with the record office for several years. Newer volunteers are less likely to have advanced research skills (i.e. be confident with

palaeography or Latin), and projects cannot always expect to attract many volunteers with these skills. However, the newer volunteers were very eager to learn, and often adapted readily to new tasks. Most of the volunteers on both parts (flood and drought) of the project were not working with Latin documents at all, and the leases project only involved four that were in Latin. However, *Flooding and Drought* was fortunate to involve one individual who had excellent Latin and palaeography skills who had been a volunteer for the record office for fourteen years, as well as extensive enough experience with title deeds that he could reliably identify uncatalogued deeds. When volunteers were surveyed, a large number of experienced, loyal volunteers were identified who had been with the Staffordshire Record Office for periods up to twenty years.[83] On projects run in-house and focused on traditional archival activities such as cataloguing, indexing, preservation or digitisation (rather than projects with a visiting researcher that aid research or artistic outputs) there are currently more established volunteers than new ones.[84]

7.5 Conclusion: The role of collaborative projects

The obvious reason for working with volunteers is to facilitate activities that the archive or a researcher on their own would not be able to do; volunteers can examine more material than a single researcher can alone. The applications for this are numerous: within archives to improve their service, to support research or using citizen science methodologies, or even for activism. This thesis has frequently discussed the challenges of accessing environmental information in archives due to data being scattered across different source material and not the explicit subject of the records. Working with volunteers presents a solution to some of these challenges. However, a collaborative project such as *Flooding and Drought* will not solve the problems with archive access alone.

By far the biggest benefit to the *Flooding and Drought* project of working with volunteers was the experience and enthusiasm of the volunteers who brought their own knowledge and desire to learn to the project. The project was successful in attracting a mixture of established and new volunteers, and was helped by both the experience of the established

[83] Appendix VII.
[84] Appendix VII.

volunteers and the enthusiasm of new ones. It also benefited the archive as many of the volunteers expressed a desire to find new volunteer opportunities after the project finished (through both the survey results and directly asking the project coordinators). Experienced volunteers contributed their skills and knowledge in many ways, including their familiarity with their local area, experience with the archive catalogue, palaeography skills and even (in one case) understanding of Latin. New volunteers were eager to learn and very quickly became valuable assets to the project. The experience was reciprocal, with volunteers developing or gaining skills and satisfying their curiosity

Survey responses from *Flooding and Drought* volunteers were overwhelmingly positive (although it should be noted that this was the norm across all projects). Every single *Flooding and Drought* volunteer who completed a survey reported having improved their knowledge, enjoyed themselves, been inspired to find out more and having met or socialised with people. Nearly all of them reported having developed skills, and most recorded an increased knowledge of Staffordshire (the others replied with "not applicable," and not all records studied by the volunteers related directly to Staffordshire). When asked about how volunteering has affected their knowledge and perception of Staffordshire, *Flooding and Drought* volunteers said that volunteering had made them more aware of the kinds of records that the archive holds, while others mentioned learning about agricultural practices and estate management. The *Flooding and Drought* volunteer who reported the longest period of volunteering with the record office replied that their involvement with the record office had developed their knowledge "in many ways - I could write a thesis on this."[85]

Flooding and Drought proved to be a successful example of volunteer engagement with the Staffordshire Record Office. Collaborative projects have been pursued by the archive as they offer opportunity to build relationships with external partners. This can produce more ambitious projects than the archive might be able to run alone. It also provides the volunteers with interesting and novel projects that can stretch them and help them learn and develop skills. Unlike most collaborative projects that the Staffordshire Record Office takes part in, *Flooding and Drought* was not a collaboration with an history department, but

[85] Appendix VII.

with a geography department. This was considered by the record office archivist to have contributed to the project becoming an engaging volunteer project, but without the intended level of catalogue enhancement (though it should be noted that these comments were not expressed as criticism). This should not discourage archives from pursuing collaborative projects with bodies other than history departments. They can be highly stimulating for volunteers and attract volunteers that might not usually consider volunteering for an archive, bringing an injection of fresh enthusiasm to the service.

Volunteer projects, particularly collaborations between archives and HEIs, have the potential to help resolve some of the access issues discussed in Chapter 5. They can facilitate research beyond the scope of one researcher alone, while providing engaging opportunities for volunteer and bringing the perspectives and research experience of archive users interested in the environment. *Flooding and Drought* was not a perfect example of this, partly because it had been intended as a catalogue enhancement project but did not fully fulfil this aim. However, it was not intended as action research, so was not planned as a means of testing solutions to archival problems. The measures outlined in Chapter 5 were intended to be adaptable depending on the repository, and not a "one size fits all" approach. The same could be said of volunteer activities. It may not be possible to create a single volunteer project that provides every solution at once – catalogue enhancement, profile-raising, research and any of the many potential other aims of a project. While projects may bring multiple benefits, they will have goals that will be prioritised over others. Therefore, collaborative projects like *Flooding and Drought* should be viewed as one potential tool for archivists and researchers: one of several approaches to solving archival problems.

8 : Conclusion

The mundane has been central to this thesis. Floods did not impact lives and livelihoods only when they were disastrous. By examining mundane flood events, this thesis has demonstrated how rich the available material is for understanding the intersections between people and the environment. To find this data, likely intersections between watercourses and human activity were targeted, focusing on records relating to watermills and bridges. In Chapters 2 and 3, rights and responsibilities over water were often found to be inseparable, because they are both different ways of viewing the same thing. As seen in Chapter 3, the right to manage land as a lessee saw fit was also the responsibility to maintain it. For a watermill to function, it needed to be able to operate with the freedom to maintain the water supply and mechanisms as needed, therefore the norm was for the lessee to hold the property for at least one life, with enough access to the water to allow the mill to function, along with the freedom to manage the property and responsibility to maintain it.

The records that were used in this thesis were administrative records of property ownership or local governance, recording court rulings or legal transactions. This is in common with the kinds of records often used by other researchers of the environment for pre-instrumental periods. They were created to record human activity, not the environment. Some records explicitly mention flooding, such as examples of bridges destroyed or a letter to the Earl of Uxbridge in 1762,[1] but many others do not. Rather than providing a comprehensive analysis of the record types selected, the case study demonstrated that these records present incredible potential for understanding the mundane in environmental history.

While administrative records are not the only material that have been used by scholars to examine historic environment (as discussed in the literature reviews for Chapters 2 and 3), this thesis has shown that for the period 1550-1750 administrative and legal processes are extremely useful. In Chapter 5, researchers were surveyed about their experiences in archives and biggest barrier that was identified by was a lack of recording of relevant

[1] SRO D603/E/1/172.

information or retention of records. However, this thesis has found that administrative processes that required record creation can be a source of data, even if the records in question were not created with the intention of recording the environment. They can generate an almost continuous series of records, which is of particular benefit when examining long-term issues such as weather. Court records were particularly valuable for understanding the impact of flooding on infrastructure, boundaries, and the tensions between different parties' responsibilities and jurisdictions. Resolving legal cases (whether extra-judicially, in manor courts or in Quarter Sessions) was often a matter of determining responsibility for maintenance or repair work. Because watercourses might be the responsibility of multiple parties, the lengthy legal and administrative processes involved in managing them can also contain valuable description of flood events, flood defences, repairs, and maintenance. Although problems that were resolved without intervention from the courts were unlikely to leave a record, Chapter 2 found many examples of issues affecting major infrastructure (such as bridges or roads) and tensions between neighbouring property.

Although these records were initially examined with methods that would be familiar to social historians and environmental historians of this period, Chapter 4 explored how quantitative methods of analysis drawn from environmental sciences (such as indices) might be applied to the same material. The regular nature of court sessions (particularly at the level of Quarter Sessions) and the need to follow procedures produced a regular series of records with few gaps. Although proving less informative on the mundane than was anticipated, these records did reveal useful data on more damaging flood events. Using court records allowed comparison between bridge repairs, drainage and known flood events, finding some correlation between the two, and between drainage issues and the scarce available rainfall data. Possible flood rich periods were identified in the 1650s, 1708-1712 and in the 1730s-1740s. A combination of qualitative and quantitative analysis also provided indications of the causes of floods when disaster did occur, with precipitation, late summer storms and snow or ice melt in late winter or early spring emerging as causes of major flooding.

This study into mundane flooding was used to examine archive access for environmental research. Because (as discussed in Chapter 5) means of recording visitors to UK archives do not usually categorise archive users based on research topic archive users interested in the environment are rarely recorded. Archivists might be personally be aware of queries

related to the environment but as accessing UK archives usually does not involve a reference interview, many researchers do not directly interact with archivists. However, there is a thriving network of researchers using archives for environmental research and for some years there has been growing awareness of the potential of UK archives for environmental research as well as a strong tradition, particularly in historical climatology (as discussed in Chapter 4), of using descriptive source material to examine the environment in the past. These researchers have been under-served in archival theory and this thesis has addressed that by examining practical solutions to access problems.

Although in this study I have only discussed the experience and needs of academic researchers, they form a substantial portion of archive usership and in the 2018 Survey of Visitors to UK Archives they accounted for over a quarter of visitors. As environment and climate are central to major social issues in the present day, archives have considerable potential for use by many people besides academic researchers for understanding the environment; they are frequently used for rights of way research and other possibilities have not yet been fully explored. While this project has focused on academic research, the volunteer project has been a major component and the success of it as an example of public outreach demonstrates possibilities beyond academia. Buchanan and Bastian have shown the potential of archives for activist environmental research,[2] meanwhile this thesis has shown the potential for the environment as an engaging volunteer project and other archives have also undertaken successful environmental projects. There is therefore a clear value in exploiting archives for environmental research, which has unfortunately previously been mostly overlooked.

This thesis has set out to demonstrate that there are achievable ways for archives to support environmental research. This research has demonstrated that existing cataloguing practices contribute to the invisibility of environmental data and impede environmental research, which might lead to the conclusion that cataloguing practices designed for environmental research are not necessarily the solution. Prioritising the environment when creating catalogue description might mean ignoring other research interests. It would also not be possible for an archive to re-catalogue its entire holdings with one interest in mind.

[2] Buchanan and Bastian, "Activating the Archive: Rethinking the Role of Traditional Archives for Local Activist Projects."

Indeed, it is a principle of archival cataloguing that its contents should represent the provenance and original context of the records rather than the changing interests of researchers. Therefore, the most effective and achievable measures are those that guide researchers to the desired material, rather than improve the cataloguing of individual records.

Chapter 5 identified a number of measures that could assist environmental research (Table 5.8) and a good/better/best ranking created based on how achievable they would be for many repositories. These recommendations were divided into four categories. The first was "Environmental mindedness," that archivists should be aware of the potential of their collections for environmental research and therefore be able to respond to queries and undertake future work while being conscious of the possibility of environmental uses of their materials. This required no specific recommendations, as any environment-related activity develops awareness of the environment. The second group of recommendations concerned cataloguing practices. The records used in this thesis were not created to record the environment. As a result, archival description focused on records as documentation of the activity of records creators (as characterised by Bearman[3]) can conceal whether records can be of use to an environmental researcher. However, it was acknowledged that ambitious catalogue enhancement is challenging to achieve, and this was considered less important than other recommendations.

Third, I recommended the creation of relevant research guides, with further guidance on this in Chapter 6 and an example in Appendix V. Chapter 5 found that researchers make use of research guides, however at present guides specific to the environment are rare. The researchers surveyed showed a preference for administrative records, including an explicit request from one for a guide to using parish and manorial records for research in water histories. Therefore, subject guides that highlight the role of administrative bodies in managing the environment may be one of the most effective means of making the environmental potential of a collection accessible. The responses to the survey of researchers in water histories were all academic researchers, identified as a convenience

[3] Bearman, "Documenting Documentation."

sample. This meant that the recommendations made in Chapter 5 were based on the needs and experiences of academic researchers.

However, the advice on research guides in Chapter 6 was created assuming no prior knowledge or experience on the part of researchers, in recognition of the broader relevance of the environment beyond academia and the varying disciplinary backgrounds of environmental researchers. It is entirely conceivable that a local historian examining an area (such as Cannock Chase) would find the historic landscape interesting, or that an individual investigating the history of their home would want to know about past flooding. However, they may not search for this information in the same way as an academic researcher, couch their queries in environmental terms, or think of it as environmental. This guidance therefore recommended the incorporation of contextual or background knowledge that would help with searching an archive and interpreting records.

The final recommendation was to engage with research communities. In the final chapter this was explored further in relation to a collaborative volunteer project with the Staffordshire Record Office. The *Historic Flooding and Drought* project was used to explore collaborative projects as one solution to problems for researchers using archives. By using volunteers, data was gathered for research that would have been impossible for a single researcher and an engaging project was coordinated that the volunteers enjoyed. Similar projects can also benefit the creation of databases and other research tools, such as *TEMPEST* or the *Place Names* project that may not directly support the archive service but do aid research and might provide valuable research tools. As discussed in Chapter 4, environmental research can rely on large datasets drawing from multiple sources and the research of multiple researchers. There have been several datasets created by environmental scientists using this kind of data, including the *Chronology of British Hydrological Events* and *TEMPEST*.

Volunteer projects must be shaped by the volunteers as much as by research aims. This project was extremely fortunate to have a volunteer with a great deal of experience with leases and deeds, who also was happy to tackle occasional texts in Latin. The record office also has a volunteer who is extremely competent with Latin and has been working for a long time on Quarter Sessions records. If there were more volunteers like this, the project may have looked entirely different, and examined more material in Latin, such as Cannock and Rugeley manor courts or some of the medieval sources. However, volunteers with

these skills are as rare as they are valuable. It is more likely for a project to need to anticipate limited or developing research skills, and therefore need to prioritise more recent sources in English with less challenging palaeography. While many archive volunteers are enthusiastic and able, they are ultimately not professional researchers, which affects the tasks they are able to undertake. In Chapter 7 (7.1 Staffordshire Record Office Volunteers), Staffordshire Record Office volunteers were characterised as fitting a similar demographic profile as those described by Williams.[4] However, not all volunteers in all archives fit this profile. The Record Office occasionally hosts school students on work experience placements. Due to my prior experience with young people in museums, I was asked to spend a few hours with one of these students to explain the project. I introduced the student to the mill accounts that were later examined by one of the volunteers, which helped with planning how to ask the volunteer to transcribe them. Both the student and the volunteer were starting with the same level of prior experience with palaeography (none) but teaching them was each a different experience, partly due to differences between being an adult addressing a teenager and another adult. One student cannot be taken as representative of all, and one retiree cannot be taken as representative of all. However, some of the differences I experienced between the two have led me to ponder whether there are wider questions to consider about how volunteer demographics (whether age, race, gender, or any other factor) might impact volunteer activities and interactions with volunteers, or the positionality of the project coordinator.

When choosing material for the volunteer project, it was found that the types of records that were suitable for the volunteers overlapped with the types of record that are useful for pre-instrumental environmental research. Material examined by volunteers needs features that are often shared by the material for environmental research. Individual, scattered items were avoided for the Flooding and Drought project as they were unlikely to provide sustained engagement for volunteers. Instead, mundane administrative processes that can reliably create large numbers of records were found to present enough material to engage and challenge volunteers while also containing environmental information. The leases and title deeds analysed in Chapter 3 were a perfect example of this, as the volunteer recorded

[4] Williams, "Managing Volunteering in Archives: Report"; Williams, "The Impact of Volunteering in Archives."

data from 206 records and reported thoroughly enjoying the project (and continued working outside of the project's weekly hours).

Other projects at the record office, such as the Quarter Sessions project, have shown that volunteer projects can be used for catalogue enhancement, even though *Flooding and Drought* did not. Therefore, this thesis is not arguing for collaborative volunteer projects as a means for achieving ambitious catalogue improvement. Collaborative projects are not a substitute for existing archive volunteering, particularly as the research for the case study has benefitted from the work of a more "traditional" in-house cataloguing project. A variety of project types may be most beneficial to the archive and to researchers. Instead, collaborative projects provide a means of supporting what might initially appear to be a niche interest but which - here at least - proved highly engaging to several volunteers and which is of growing academic significance.

The strength of projects such as *Historic Flooding and Drought* lies in their ability to provide the archive with engaging and challenging opportunities for volunteers while raising the profile of the archive with the academic community, the public and governing bodies (such as local authority). Such topics can be very engaging for archive volunteers and public outreach due to being personally relatable and holding local and contemporary relevance. This presents an excellent opportunity for furthering environmental research. Environmental information can be challenging to access in archives, and collaborative projects present one solution to archival issues. By examining a topic that is almost universally relatable (everyone experiences the effects of the environment and weather), *Historic Flooding and Drought* engaged the curiosity of volunteers. The project attracted both experienced archive volunteers seeking a challenge, and volunteers who had never visited an archive before. In doing so, it also enabled research greater than might have been otherwise possible and presented a means of identifying measures that would help other researchers.

Appendix I : Chronology of flood events, storms, and noted wet or freezing weather on the River Trent 1550 – 1750

From Existing Chronologies				**From research at the Staffordshire Record Office**	
British Chronology of Hydrological Events (narrowed to Trent) http://www.cbhe.hydrology.org.uk/	CBHE			QS	Quarter Sessions Rolls
TEMPEST https://www.nottingham.ac.uk/geography/extreme-weather/search/	TEMP			RPO	Rugeley Parish Officer's accounts
The Gallery of Natural Phenomena (narrowed to events likely to affect the Trent: specific locations on the Trent or nation-wide weather) http://www.phenomena.org.uk/	GNP			APR	Alrewas Parish Register (weather events, drownings, and other possible disruption)
				WPR	Wombourne Parish Register

Blue rows indicate known flood years based on existing chronologies

Event	**Month/ Season**	**Source**		**Source**	**Month/ Session**	**Event**
			1550			
			1551			
			1552			
			1553			
			1554			
			1555			
			1556			
			1557			
On Jul 7th near Nottingham, a storm "beat down all the houses and churches," the River Trent "was carried a quarter of a mile, and cast against trees, with the violence whereof the trees were torn up by the roots, and cast twelve score yards off." Six or seven fatalities.	Jul	CBHE	**1558**			
Jul 7th, tornado, seven killed at Nottingham.	Jul	GNP				
			1559			
			1560			
			1561			
			1562			
			1563			
Cold winter, Thames frozen Dec 25th to Jan 4th	Dec-Jan	GNP	**1564**			
			1565			
			1566			
			1567			
Mar 18th a gale sunk boats on the Thames	Mar	GNP	**1568**			

Oct 30th tornado in Nottinghamshire	Oct	GNP	**1569**	
On October 5th a storm had devastating effects on the east coast. An account describes strong winds and heavy rainfall aggravating flooding, including in Bedfordshire, Huntingdonshire, Staffordshire and Warwickshire, which overwhelmed defences.	Oct	CBHE	**1570**	
			1571	
Cold winter, deep snow and freezing rain Nov 1st to Jan 6th	Nov-Jan	GNP	**1572**	
			1573	
Floods		CBHE	**1574**	
			1575	
			1576	
			1577	
Feb 4th to Feb 8th snow, people and cattle lost May 6th late snow	Feb May	GNP GNP	**1578**	
Feb 4th cold spell and incessant snow until the 8th, people and cattle lost Apr 24th to May 8th late snow, two feet deep in London	Feb Apr	GNP GNP	**1579**	
			1580	
Trent completely dry		CBHE	**1581**	
			1582	
			1583	
Jul 24th lightning, hail and floods in England, people and cattle killed	Jul	GNP	**1584**	
			1585	
Mar 30th gale in England destroyed houses and trees	Oct	GNP	**1586**	
Trent "greatly swelled by a flood, which carried away St Mary's Bridge."		CBHE	**1587**	
			1588	
			1589	
			1590	
A drought destroyed crops around Nottingham, Trent almost completely dry.		CBHE	**1591**	
			1592	
			1593	
Mar 30th gale in England destroyed thousands of trees	Mar	GNP	**1594**	
			1595	

In 1596 (or 1600) a flood changed the channel of the Trent to the west of Holme (near Carlton, Nottingham).		CBHE	**1596**			
			1597			
			1598			
			1599			
During a heavy flood, the Trent changed its course near Holme, moving Holme from the west side to the east side.		CBHE	**1600**			
Cold summer, "frosts every morning" in Jun	Jun	GNP	**1601**	APR	Jan	Jan 8th Richard Chase drowned falling out of a boat at Salters Bridge
			1602			
			1603			
			1604			
			1605			
			1606			
Severe winter with frost fair on Thames until Feb 1608	Dec-Jan	GNP	**1607**			
			1608			
Severe winter, frosts lasted four months, Thames frozen	Oct	GNP	**1609**			
Blizzards in Derbyshire and heavy rainfall causing three prisoners to drown in Derby jail. Flooding in Derbyshire		CBHE CBHE	**1610**			
			1611			
			1612	APR	Dec	Edmund? Horne drowned at Chotes Bridge Dec 26th
			1613	APR APR	May Jun	Roger Dune drowned May 22nd and retrieved from the water near Burlake May 23rd Robert Nevell and his son Robert Nevell sheltered under an oak tree in a storm on Jun 26th in Saltersholme field and were killed when it was hit by lightning
Snow and frost Jan 7th - Mar 7t16 Thawing snow and ice combined with rain caused flooding. In Derbyshire, March 12: "The great snowe broke which had continewed ffrom Ffriday seaven weekes before."	Jan-Mar Jan-Mar Mar	GNP CBHE TEMPEST	**1614**	APR	Nov-Dec	Alrewas mill ceased grinding Nov 15th - Dec 21st (no reason given)
Late snow on May 1st in Derbyshire, 1 foot deep.	May	CBHE & GNP	**1615**			

Only two days of rain from March 25th to August 4th	Mar- Aug	CBHE				
			1616	APR	Dec	Dec 12th William Turner was drowned at Chotes Bridge after his horse slipped, "the water being out"
			1617			
On Sep 4th in Wistow "About six in the morning the waters so increased that they prevailed to carry the bier about the church and ran over the communion table"	Sep	CBHE	**1618**			
			1619			
			1620			
Nottinham Bridgemaster's accounts include 4s 8d paid to have ice under the bridge broken to provide passage.		CBHE	**1621**			
			1622			
			1623			
Long hot summer led to a forest fire in Derbyshire on Aug 23rd	Aug	CBHE	**1624**			
			1625			
			1626			
			1627			
			1628			
			1629			
			1630			
			1631			
			1632			
			1633			
River Trent frozen Court injunction gained to unblock the old Idle River, which had been altered in the Great Drainage of Hatfield and Axholme.		CBHE CBHE	**1634**	QS	Trinity	Damage to Salter's Bridge by flooding of River Mease and repairs needed for Stringford Bridge.
			1635			
Blizzard in England and Scotland Jan 29th killed many travellers	Jan	GNP	**1636**			
Sun's light and heat "perceptibly diminished" by sunspots		GNP	**1637**			
			1638			
			1639	WPR	Jan	A "great and suddaine" flood destroyed the mill in Wombourne on Jan 28th
			1640			
			1641			
Inhabitants of the Isle of		CBHE	**1642**			

Axholme broke down floodgates to prevent Royalist invasion, causing massive damage from flooding.						
			1643			
			1644			
			1645			
			1646			
			1647			
			1648			
			1649			
			1650			
			1651	APR	Aug	William Byker buried on Aug 31st having drowned in the Tame
			1652			
			1653			
			1654			
			1655	QS	M.mas	Flooding of a highway at Coven Heath as a watercourse dividing the parishes of Bushbury and Brewood had been stopped up at Brewood Forge.
			1656	QS	E.phany	Flooding on the road between Uttoxeter and Ashbourne and assistance needed to maintain the bridge.
Hot summer	Jun	GNP	**1657**			
			1658			
			1659	QS	M.mas	Presentment for neglecting the river defences in the area of Busbeys Little Close, Uttoxeter.
			1660			
			1661			
Mild winter in London, like "May or June." Gale, SW stome and thunder, "windy Tuesday"	Jan Feb	GNP GNP	**1662**			
Cold summer, frosty "no summer at all"	Aug	GNP	**1663**			
			1664			
			1665			
			1666			
			1667			
			1668			
			1669			
			1670			
			1671			
			1672			
Flooding in Derbyshire St Werburgh's church in Derby flooded with 2 feet of water from	 Jul	CBHE CBHE	**1673**	QS	M.mas	A forge on the River Stour at Amblecote created an obstruction causing water to flood

Markeaton Brook on 19th Jul.						the highway.
Great floods in the Midlands on May 7th and 8th.	May	CBHE	**1674**			
			1675			
			1676			
Floods on the Idle.	May	CBHE	**1677**			
			1678			
			1679			
Floods on the Idle.	Aug	CBHE	**1680**	QS		The wooden Bridge in Trentham was damaged, endagering travellers "in time of great floods."
Flooding on the Idle at Christmas.	Dec	CBHE	**1681**			
Meadows on the Idle "drowned" and the banks at Thorne breached	Spring	CBHE				
A "severe" frost in Sep 1682-Feb 1683 in Nottinghamshire and Derbyshire. Fuel and food were in short supply and boats on the Trent were at a standstill.	Sep-Feb	CBHE	**1682**			
The Trent was frozen at Nottingham and when the frost broke up the bridges at Nottingham and Muskham were destroyed by floating ice.		CBHE	**1683**			
Snow and ice from Sep 1683-Feb 1684 thawed on Feb 5th when floating ice destroyed the Trent Bridge.	Sep-Feb	CBHE				
Severe winter, Thames Frost Fair begins.	Jan	GNP	**1684**			
Sea ice on the English Channel	Feb	GNP				
Snow and ice from Dec 13th 1683-Feb 1684 thawed on Feb 5th when floating ice destroyed Nottingham and Muskham bridges.	Feb	CBHE				
Dec 23rd, blizzard in South England and many froze to death	Dec	GNP				
			1685			
Flooding on the Idle.	May	CBHE	**1686**			
Areas of Hatfield Chase and Axholme were affected by "devastating floods."		CBHE	**1687**			
Dec 20th - Feb 6th, severe winter, Thames frozen, frost fair	Dec-Feb	GNP	**1688**	QS	Trinity	Water pounded above Cheddleton Mills causing danger to the public.

Flooding on the Idle.	Oct	CBHE	**1689**			
Jan 11th gale and snow in England, many killed	Jan	GNP	**1690**			
Long frost winter 1690/1		CBHE	**1691**			
Spring floods on the Idle.	Spring	CBHE	**1692**	QS	Easter	A road in the parish of Wolverhampton was damaged because "an ancient watercourse" was blocked and the road flooded.
			1693			
			1694			
Cold winter, frost and snow for five weeks to end of Jan	Jan	GNP	**1695**			
The end of the year was so wet that "The earth almost swims with water". At Thorne the flood waters breached the banks on Dec 15th.	Dec	CBHE	**1696**	QS	M.mas	Flooding of a meadow and pasture in Penckrich due to opening of flood gates.
May 4th, hail in Hertfordshire, stones 14 inches round, several killed. May 10th, Wales to Lancashire, lambs poultry and dog killed, several persons injured. Flood at Gainsborough "ran against [th]e upper part of trees growing on Saundby Marsh bank." Downstream, riverbanks gave way and were breached. Then there were several days of fine weather. On 28th December it began to freeze again andthe next day more snow fell bringing fears of "another great thaw and deluge." "Serious floods" on the Trent	May May Dec

Trent						
A "smaller inundation'' than that of Dec 1688		CBHE	**1701**			
Mar 5th - 24th "heat as in July" wind E.N.E	Mar	GNP	**1702**			
Nov 26th, gales in England, "The GreatStorm," 8,000 drowned at sea	Nov	GNP	**1703**			
			1704			
			1705			
"Serious floods" on the Trent Jul 16th extensive flooding in Wales	Jul	CBHE GNP	**1706**			
Heat in England, several people died on "Hot Tuesday" Jul 8th.	Jun	GNP	**1707**			
Cold summer and hoar frost Jun 12th	Jun	GNP	**1708**	RPO QS	Sep M.mas	Sep 15th flooding destroyed dams, floodgates, hedges and shops in Rugeley John England, miller in Tamworth stopped the River Tame without "securing" the road between Tamworth and Hopwas.
Feb 1st, Ashbourne, Derbyshire, Grace Brunley drowned by slipping off the plank on the footbridge at Clifton Mill on a dark and rainy night during a flood (Jan 29th)	Feb	CBHE	**1709**	QS	Easter	Dovebridge lane, Uttoxeter, in good repair, but the inhabitants engaged in building sluices and ditches to alleviate flooding
			1710			
			1711	QS	Trinity	Due to floods, Stone Bridge (Brewood, between Stafford and Bridgenorth) and a bridge on Watling Street (Brewood) were both "out of repair"
			1712	QS	Easter	Local inhabitants of the north part of the Totmonslow Hundred requested that Wall Bridge over the River Churnett on the road from Leek to Newcastle be replaced by a stone bridge owing to floods making the road impassable.
			1713			
			1714			
Jul 3rd in Ashbourne, Derbyshire Lesley Sherrard drowned at Mapleton riding over the	Jul	CBHE	**1715**			

Dove from Okeover to Mapleton his horse slipped and he fell into the water, and his body washed up down stream.					
Cold winter, frost fair in London	Jan	GNP	**1716**		
			1717		
			1718		
Heat and drought "such a summer for heat hardly known."	May-Aug	GNP	**1719**		
			1720		
			1721		
			1722		
			1723		
			1724		
In Burton Joyce the church was liable to damage from floods, being only 160 yards from the Trent. In 1725 there was a particularly damaging flood and churches throughout the country were asked for help in raising the money needed for repairs.		CBHE	**1725**		
			1726		
			1727		
A great flood in Nottingham, "the like of which had not been known within the memory of people then living," known as the midsummer flood.	Jun	CBHE	**1728**		
			1729		
In Selford a potential waterspout was sighted over the River Trent causing flooding	Aug	CBHE	**1730**		
			1731		
			1732		
			1733		
"The late heavy Rains have laid most Part of the low Lands in this Kingdom under Water [...] Especially from Staffordshire they write (a County abounding with Rivers) that their Meadow-Lands are covered with Water for several Miles about. [...] in Scotland and the remote Parts of England, where we hear it is impossible to travel without great Hazard of	Dec	CBHE	**1734**	QS Epiphany QS Easter	A ditch/drain in Buttcroft Lane on the road from the village of Darlaston to Walsall stopped up, thus causing "danger" to people and animals using that road. Presentment that the stank (ditch) in the road in the parish of Wednesbury is sufficient and open, and not a nuisance or danger to the road.

their Lives."						
Jan 8th a gale "the most violent since 1703" Jan 11th the River Trent was so high that the bridge was destroyed and impassable, travellers from the North to London had to go via Nottingham. Jan 18th "The Waters are so much out about Hull, Stone, Newark, Tucksford, &c. that Travellers hardly ever went in more Danger of their Lives."	Jan Jan Jan	GNP CBHE CBHE	**1735**			
Midsummer flood on the Trent: "The water in many of the houses near to the Meadows was two or three feet deep. A vast deal of hay was spoiled, and other damage done to a very serious extent." Flooding cut off communication over the Trent	Jul	CBHE CBHE	**1736**			
			1737			
			1738			
The 'Newcastle Waggon' was lost in a flood when attempting to cross the Trent by Muskham Ford. Rain every day at the end of Jul until Aug[?] 8th including flooding at Tamworth. Severe winter, "Great frost" began Dec 25th and northerly winds until summer.	 Jul Dec	CBHE CBHE GNP	**1739**			
Very cold By Dec 8th there had been continual flooding for more than a fortnight and snow melt with rain on the 8th caused the "greatest flood that has been known for many years"	Jan Dec	GNP CBHE	**1740**	APR APR	Jan Dec-Feb	"A great frost in Anno Domini 1740 the beginning of this year" George Lucas drowned crossing Whichnor Bridge while travelling home between 9 and 10 at night on Dec 21st, it being "a very tempestuous snowy night" and was not found until Feb 6th
Water scarcity A small flood Oct 23rd and larger Oct 26th on the Tame.	Jul Oct	CBHE CBHE	**1741**			
Storms in Stafford in late Jun, flooding 25th	Jun	TEMP	**1742**			
			1743			

			1744			
			1745			
Frost and snow until Feb 14th and a flood on the Tame on the 15th	Feb	CBHE	**1746**	QS	Easter	Gravel and other materials obstructing Park Lane Brook causing it to overflow and flood part of the Sedgley to Wolverhampton road.
Mar 22nd a foot of snow fell and melted by noon (River Tame) Dec 9th snowmelt caused "a great flood"	Mar Dec	CBHE CBHE	**1747**			
			1748			
So much rain and snow that the Tame was high for 5 or 6 and navigation of the Thames and Severn stopped.	Jan	CBHE	**1749**			
			1750			

Appendix II : Search results in the Staffordshire Record Office's online catalogue for "flood," "flooding," "flooded," and "floods."

Descriptions provided are correct as of 1st August 2019 and have been shortened to only the most relevant sections. After completion of the project, I have added "floods" as an index term to all appropriate entries present here.

Reference number	Title	Date	Description (abridged)	Search Terms
D783/1/1/1	"Annales Aldervasenses" - Register of baptisms, marriages and burials	1547-1747	[…] e.g. Civil War, floods, monstrous births of animals […]	Floods
D(W)1734/2/3/112b	Valor or rental of all the property of Lord Paget	[1550]	[…] Floods at Burton […]	Floods
D3710/1/1	Register of baptisms, marriages and burials *(Wombourne)*	1570-1704	[…] Flood, 1639. Storm, 1640 .[…]	Flood
D(W)1788/P35/B9	Mutual releases to settle disputes, Aqualate estate administration and settlement	1571-1697	Counterpart lease for 60 years, land and flood water or water that after rain runs down the street of Wharton […]	Flood
D(W)1734/1/3/30	Paget v. Adams, Oliver, Byrde, Harryman, Moore, Blyes, Weston	1581	[…]complaints that plaintiff has inclosed parts of Cannock Wood to detriment of commoners, and with his iron mills […] flooded highways, houses and crops.	Flooded
D(W)1788/P49/B7	Papers concerning disputes over watercourses	1593-1634	[…] complains against Skrymsher about the flooding of his land caused by the harnessing of the water at Mere mill […]	Flooding
D1287/18/2 (P/399/108)	Copy letter from 'Jac Aretius' [?James Martin] to Robert Flood	22 Aug 1633	Re Flood's heresies. […] *(Draft catalogue)*	Flood
Q/SR/215	Sessions roll *	Jul 1634	Trinity 1634, certificate of damage to Salter's Bridge by flooding of River Mease […]	Flooding
S. MS 561 (William Salt)	Letter from the Marquess of Newcastleand Lord Eythin, Newcastle, to Charles I. They were recalled from subduing Derbyshire by the Scots' unexpected winter invasion, and reached Newcastle just in time to beat off a Scottish attack. They have only 8000 men against the Scots' 16000, while Sir Thomas Fairfax threatens West Yorkshire and Lord Fairfax advances from Hull. Should they fight and risk losing the North? Also letter from Newcastle to Lord Digby asking for a considerable	13-16 Feb 1644	[…]His army struggled there through the floods […]	Floods

	force to be sent to them.			
Q/SR/265/28	Indictment of Walter Webster, husbandman, lately of Shenstone	Jan 1649	Charged with failure to maintain his ditches, causing flooding […]	Flooding
Q/SR/271/30	Deposition of John Daws of Yoxall, dyer	Jan 1651	[…]Henry Ford of Newborough overtook them near Yoxall Bridge which was flooded […]	Flooded
Q/SR/271/31	As in Q/SR/271/30			Flooded
D868/5/4	Letter from WD [William Dugdale], London, to [? John Langley], Trentham	8 Sep 1655	[…] Mentions damage caused by the flooding of the Trent. […]	Flooding
Q/SR/292/16	Petition by inhabitants of Ilam	Oct 1655	[…] a bridge over the River Dove at Ilam which had previously been repaired by neighbouring towns but was now in disrepair following a flood […]	Flood
Q/SR/292/58	Indictment	Oct 1655	Indictment of the inhabitants of Essington in the parish of Bushbury regarding flooding of a highway at Coven Heath […]	Flooding
Q/SR/293/4	Petition by the inhabitants of Combridge	Jan 1656	A petition by the inhabitants of Combridge concerning flooding on the road […]	Flooding
Q/SR/297/16	Presentment by officials of Barton	Jan 1657	[…] claiming customary right of way through Barton field in the event of flooding. […]	Flooding
Q/SR/299/85	Indictment of Humphrey Hall of Doveridge (Dubberige) in the county of Derby.	Jul 1657	[…] charged with not maintaining the riverbank forming the county boundary thereby causing flooding by the River Dove. […]	Flooding
D868/4/30b	Letter from [S. Charlton, London, to Sir Richard Leveson]	4 Jan 1658	[…]death of 30,000 people in floods in Holland.	Floods
Q/SR/308/3	Presentment by Justices of the Peace	Oct 1659	[…] Flooding had altered the course of the river and changed the county boundary […]	Flooding
D(W)1790/A/6/28a-b	Final Agreement	[1662]	[…]3 acres of flooded land […]	Flooded
Q/SR/348/13	Indictment of John Finch, yeoman, lately of Dudley in Worcestershire and Ambrose Croley, blacksmith, of Stowerbridge [Stourbridge].	Jul 1670	[…]the highway leading from Stowerbridge to the market town of Wolverhampton is flooded […]	Flooded
Q/SR/354/15	Indictment of John Finch, yeoman, lately of Dideley [Dudley] in the county of Worcestershire.	Jan 1672	Charged with failing to ensure that the road leading from Stourbridge to Wolverhampton was not flooded from the river […….rker] at Amblecott [Amblecote] […]	
Q/SR/361/7	Indictment of John Finch, yeoman, lately of Dudley in the county of	Oct 1673	Charged with working a forge on the River Stower	Flood

	Worcestershire and Ambrose Croley, blacksmith, of Stowerbridge [Stourbridge] in the county of Worcestershire.		[Stour] at Amblecoate [Amblecote] and creating an obstruction causing water to flood the common highway there […]	
D3243/4/1	Parish officers' account book	1683-c.1775	[…] Damage caused by flood, 1708. […]	Flood
Q/SR/381/6	Notes	nd [1680]	[…] wooden Bridge in Trentham was in (disray) [disrepair] to the danger of travellers passing that way in time of great floods. […]	Floods
Q/SR/392/20	Accounts of John White	Jan 1684	[…] for making up a causey carried away by a flood […]	Flood
Q/SR/394/1	Indictment of William Nabbs, gentleman, of Stafford.	Jul 1684	Charged with allowing a weir on the River Churnet at Kingsley to flood […]	Flood
D3359/52/14/14	Will of John Muchell of the Flood Gates, Cheshire	15 Oct 1686	Wills and probate papers	Flood
Q/SR/428/9	Indictment of Humphrey Swan, miller, of Penckrich [Penkridge]	Oct 1696	Charged with flooding meadow and pasture in Penckrich by opening floodgates.	Flood, Flooding
S. MS 237/24 (William Salt)	Loxdale Manuscript - W: Extracts taken from Bennet's Abridgement of the London Cases etc.	18th cent	[…] with a table at the back showing a timeline from creation to the flood. […]	Flood
D1287/Add III/3	Account of revenues and disbursements from the revenues of Wigan Rectory	1703-1704	[…] repairs to the riverbanks [flood prevention?] […]	Flood
B/C/5/1706/90	Case type: Testamentary/ Account and inventory	29 Jan 1705	[…] Further details: will in file; Mr. Oldfield apothecary; funeral detail; burial in Dovebridge church, floods. same document as inventory	Floods
Q/SR/472/15	Presentment by Grand Jury	Jan 1709	[…] the bridge over Black Brook in the parish of Weeford, on the post road between Chester and London, had fallen down in a flood and a post boy drowned as a result […]	Flood
Q/SR/473/3	Presentment by Justices of the Peace	Apr 1709	[…] the inhabitants of Uttoxeter were still employed in the further repair of Dovebridge Lane by making sluices and ditches to alleviate the flooding problem. […]	Flooding
Q/SR/479/8	Presentment by Grand Jury	Jul 1711	Presentment by Grand Jury [signatures appended] that by reason of floods, the bridge called Stone Bridge on the road between Stafford and Bridgenorth in the parish of Brewood is out of repair […]	Floods
Q/SR/482/30	Testimony	Apr 1712	[…] Wall Bridge over the River Churnett on the road from Leek to Newcastle be replaced by a stone bridge	Floods

			owing to floods […]	
D603/K/4/1	Letters mainly from Joseph Adey, Thomas Hixon and Peter Walter, relating to estate business	1714-1733	[…] floods in Staffordshire (f. 61) […]	Floods
Q/SR/490/15	Letter from Ja[mes] Wood	Jul 1715	[…]the flytering which preserved Dove Bridge had been destroyed by floods. […]	Floods
D1287/18/6 (K/41)	Letters to Sir John Bridgeman re Bolton estate business	1719-1746	[…] watercourses and flooding […] *(Draft catalogue)*	Flooding
7147/1-50	Documents mainly relating to Talbot's Hoar Cross Estate	1720-1795	[…] (31) copy letter to Mr Jervis relating to flooding on Lord Shrewsbury's land, 1784 […]	Flooding
D603/E/1/172	Lease of fulling mill called Nether Walk Mill now converted into a forge for hammering and plating iron, with the lock lately erected in the mill yard With attached letter dated 27 Feb 1762 from William Wyatt to Lord Paget discussing the property, including a lock in the mill yard and the impact of flooding and water shortage on the mill.	28 Aug 1721	Term: lives. Henry, 1st Earl of Uxbridge to Thomas Seal, ironmonger.	Flooding
Q/SR/515/6	Testimony by Grand Jury	Apr 1723	[…] the highway between Newcastle and Leek at Foxley Brook, Norton, is out of repair and not passable in time of flood […]	Flood
5350/p 105	Journal entry	Nov 1737	Weather; hailstorms; flooding of Trent	Flooding
5350/pp 167 - 168	Journal entry	Dec 1738	Weather; floods; cases of fever at Walsall	Floods
S. MS 47/14 (William Salt)	Correspondence and papers concerning Ann, Richard, and William Congreve relating to financial, personal, social, estate, family and military matters.	1739-1740	[…] water damages, and suggests preventative measures to stop the flooding […]	Flooding
D1287/18/15 (P/511)	Out-letter book of Sir John Bridgeman on estate matters	May 1743-Jun 1747	[…] Bolton chancel repairs and flooding of land.	Flooding
S. MS 428/8 (William Salt)	Case papers - Crewe v. Harding and Layton; Crewe v. Poole, for flooding of coal mine at Madeley.	c 1745-1749		Flooding
Q/SR/598/5	Indictment of Joseph Gibbons and Richard Guest of Sedgley, both yeomen	Apr 1746	[…] obstruct a watercourse called Park Lane Brook causing it to overflow and flood part of the Sedgley to Wolverhampton road […]	Flood
M833	Papers relating to a case concerning mining rights at Keeled	1747	[…] causing the flooding of the plaintiff's coal works.	Flooding
D1287/18/7 (K/51)	Letters to Dr Roger Bridgeman from Thomas Rainford [? Wigan bailiff]	1747-1749	[…] flooding in Wigan and local gossip. (Draft catalogue)	Flooding
S. MS 466/18 (William Salt)	Dr Richard Wilkes's papers for his History of Staffordshire; account	mid 18th	[…] his failure to drain the Broad Water and a flooded	Flooded

	of the steam engine, plan of pump, Roman gravestones, replies to Wilkes's queries.	century	mine at Willingsworth near Wednesbury […]	

Appendix III : Surveys

Search behaviour of researchers in water histories in UK archives

1. What department do you work in and what is your job title?

   a. How would you describe your disciplinary identity? E.g. cultural historian, historical geographer, etc.

2. How do you consider your level of experience with archival source material? Please tick the most accurate option.

	I routinely use original documents as part of my research
	I mostly use digitised source material (e.g. online parish registers)
	I only use published source material
	I only use secondary source material

3. What are the most useful types of records you have used for researching water histories?

   a. What types of record would be ideal for your research, but you have not been able to use?

4. How have you identified documentary source material for your research? Please tick all that apply.

	From secondary sources
	From online, google-style searches
	From archival gateway sites such as Discovery
	From record office online catalogues
	From record office paper catalogues
	By word of mouth, such as from fellow scholars or archivists

5. What search terms have you used to find water histories? E.g. water, flood, floods, inundation.

   a. Which of these terms have been useful?

6. Have you made use of additional resources in order to find material? Please rank each option 1-3 (most to least) based on the frequency you use it and how useful it is as a research resource.

Frequency	**Resource**	**Usefulness**
	Archive research/subject guides	
	Advice from archivists	
	Other, please specify:	

7. In your experience, what is the biggest barrier to finding useful material? Please tick the most accurate option.

	The data not having been recorded in the first place
	The data or records you would like to use have not survived
	Poor archive cataloguing
	Other, please specify:

   a. What do you think might help resolve this barrier, if anything?

8. Do you have any further comments on using archives to research water histories?

Environmental History in Archives

1. Name of Repository

2. Do you know of any material in your archive that might be relevant to environmental research? Please identify the main fonds and, if appropriate, sub-fonds, series and/or items. It is not necessary to go into great detail or to provide classmarks – e.g. Quarter Sessions records is sufficient, but if the relevance to environmental history is unclear from the titles, please provide a brief explanation of the significance (e.g. papers of Joe Bloggs, who kept a rainfall diary for the years 1800-1815).

3. How a researcher might find material

a. Are the above records catalogued? What standards are used? Are the catalogues available online? Is the relevance to environmental history clear from the catalogue description?

b. Are the above records or catalogues indexed? What standards/thesauri are used? If an in-house or customised thesaurus is used, what indexing terms in the thesaurus relate to environmental history?

c. If the thesaurus includes terms relevant to environmental history, have any relating to water management/flooding been applied within your index?

d. If none of the above, can you comment on whether/how researchers interested in environmental history might be able to identify these records as being relevant to their research?

4. Do you have any research guides that might be useful for environmental history? If so, would you be able to send me a copy/copies?

5. Have you been aware of any researchers in your repository with an interest in topics related to flooding, weather or historical natural environment? If so, how are you aware of their interest (e.g. personal knowledge, publication history, record in visitors' book). If you categorise classes of reader by research interest would you be able to identify those interested in environmental history from your classifications (and how)?

6. Have you have ever had any enquiries under the Environmental Information Regulations?

7. Do you have any further comments relevant to the above?

Volunteering at the Staffordshire Record Office

SECTION A: THE PROJECT(S) YOU VOLUNTEER FOR

Which volunteer projects are you currently part of? (Please mark X for all that apply)

- Magistrates Records ☐
- Quarter Session Records ☐
- Victoria County History research group ☐
- Place-name research project ☐
- Historic flooding and drought in Staffordshire ☐
- Preservation volunteers ☐
- Pauper Biographies ☐
- Digitisation ☐
- Criminal Quilts ☐
- Other, please specify:

(a) Have you volunteered for the Staffordshire Record Office prior to the project(s) you are currently involved in? (Including projects that have finished or that you are no longer part of)

- Yes ☐
- No ☐

(b) If Yes at (a) above, please indicate which projects you have been involved with in the past:

Approximately how long have you been volunteering with the Staffordshire Record Office for?

	years		months

(a) Do you do voluntary work for any history or heritage organisations other than the Staffordshire Record Office?

- Yes ☐
- No ☐

(b) If Yes at (a) above, please provide more details of the type of activities you do:

SECTION B: THE REASONS YOU VOLUNTEER

(a) Had you ever visited the Staffordshire Record Office before you started volunteering?

- Yes ☐

No ☐

(b) If Yes at (a) above, do you consider yourself a regular user of the Staffordshire Record Office?

Yes ☐

No ☐

How did you hear about the project(s) you are part of?

Newsletter ☐

Twitter ☐

Facebook ☐

A blog for the project (e.g. floodanddrought@wordpress.com) ☐

Word of mouth ☐

Other, please specify:

(a) Why did you decide to volunteer for the Staffordshire Record Office, and what did you hope to gain from the experience? (Please mark X for all that apply)

To learn new skills or develop existing ones ☐

To learn more about Staffordshire and its history ☐

The subject of the project(s) interested you ☐

Meet or socialise with people with similar interests to yourself ☐

To be part of a project that improved the Staffordshire Record Office's service (e.g. through catalogue improvement) ☐

To be part of a project that had other benefits for the wider community (e.g. artistic or cultural outputs.) ☐

To gain work experience or employable skills ☐

Other, please specify:

(b) What benefits have you experienced from volunteering? Please indicate whether you agree or disagree with the following statements. (Please mark X in one box in each row)

	Agree	Disagree	N/A
I improved my knowledge in an area of interest	☐	☐	☐
I developed new skills or improved existing ones	☐	☐	☐
I have a greater understanding of Staffordshire, its history, and its people	☐	☐	☐
I enjoyed myself	☐	☐	☐
I am inspired to find out more	☐	☐	☐
I have met or socialised with people with interests	☐	☐	☐

similar to my own

Other, please specify:

(a) Do you feel that your role as a volunteer is valued by the Staffordshire Record Office?

Yes ☐

No ☐

(b) Please provide more detail to support your answer. (For instance, examples of behaviour by SRO staff).

Has volunteering with the Staffordshire Record Office changed your perceptions or knowledge of Staffordshire's history, people, culture or landscape? If so, how?

Based on your experience with the project(s) you are part of, how likely are you to take part in a future volunteer project with the Staffordshire Record Office?

Definitely will	Likely	Maybe	Unlikely	Definitely will not
☐	☐	☐	☐	☐

Do you have any further comments about volunteering with the Staffordshire Record Office?

SECTION C: ABOUT YOU

Your gender?
Please mark X in one box

- Male ☐
- Female ☐
- Prefer not to say ☐

Your age?
Please write in, e.g. 53

☐

Prefer not to say ☐

Your ethnicity?
Please mark X in one box

- Asian ☐
- Black ☐
- White ☐
- Mixed ☐
- Any other, please state: ☐

Prefer not to say ☐

What is the area code/first four digits of your postcode?

☐☐☐☐

Prefer not to say ☐

Please indicate if you have a disability or condition in any of the following areas: [Please mark X in all that apply]

- None / not applicable ☐
- Hearing, e.g. deafness or partial hearing ☐
- Dexterity, e.g. using a keyboard ☐
- Mobility, e.g. walking short distances or climbing stairs ☐
- Learning / understanding / concentrating ☐
- Mental health ☐
- Vision / eyesight, e.g. blindness or partial sight ☐
- Any other, please state: ☐

Prefer not to say ☐

Appendix IV : Archive material suggested by surveyed repositories

The material is listed as it was described by the archivists, with minimal editing to provide consistent formatting.

Anglesey Archives

- Modern material includes planning issues, statements, archaeological investigations, land use, environmental sub committees. There are a few images of floods between 1920 and 1985.
- WDAZ/46 is a letter talking about a train journey from Paris to Verona where “All the passengers had to leave the train due to a great flood which swept away three bridges.” 1882 Oct. 1
- Holds personal correspondence which may be useful.
- In a 2014 an oral history project was conducted. One interviewee mentions his involvement in flood defences [c. 1950]. It is possible that these topics are mentioned in other oral history transcripts.
- WDD is a collection of an estate called Rhuddgaer. Included is a report to propose a scheme to drain the land and stop flooding by the mill pond, 22 Apr 1879. (It could just be that the pond is badly made but it might be flooding due to heavy rain).
- WDD/646 is a notebook from 1884: Questions asked by W. H. Owen of Dr Clift and his surveyor, measurements of various sections of the proposed line, and comments on the unsuitability of the proposed line because of steep gradients and flooding by spring tides.

Bath Record Office

- BC/2 are Council minutes including surveying, sanitary, street improvements, planning and housing committees, amongst others.
- BC/7 are records of Bath City Council and Bath & North East Somerset Council: records relating to infrastructure This sub-fonds includes records relating to:
    - Water supply
    - Sewers, drainage, and waterways (including plans of sewers)

  - Waste disposal
  - Highways, bridges, vaults, and car parks
  - Trams
  - Electricity supply
  - Hedgemead landslip
  - Combe Down Stone Mines stabilisation project
- BC/6 Records relating to property owned or administered by Bath City Council and Bath and North East Somerset Council. The records in the sub-fonds form a very significant collection. There are static snapshots of the Council's entire holdings in the form of surveys, dating from the seventeenth to the twentieth centuries. Lease registers provide detailed records of the arrangements it made with its lessees as a landlord, whilst rentals record the money paid to the council in rent. Title deeds, mainly eighteenth to twentieth centuries but with some from earlier centuries, record both the Council's acquisition and disposal of land, from short-term to permanent. There are many plans, which were often created as appendices to leases, to define accurately the property conveyed by the lease. In the twentieth century, more detailed records of the management of individual properties began to be created, with one or more files per property recording transactions with lessees and the management of the fabric of properties.
- BC/8 Bath City Council and Bath & North East Somerset Council: Planning and Development Control records. Includes Building Control records from 1860s and planning applications from 1930s. The planning applications are catalogued in detail as BC/8/6. Includes planning strategy, and local and regional structure plans. BC/8/3 is records relating to slum clearance and council housing.
- BC/14 Records of the public health responsibilities of Bath City Council
  - Reports of the Medical Officer of Health (various series)
  - Public Analyst - register of samples received
  - Notices issued [to individuals] under Public Health Acts
  - Reports on house inspections, mid C20
  - Papers relating to the creation of the statutory hospital, Claverton Down
  - Printed guide to the Public Health services of Bath City 1939
- BC/16 Records relating to the responsibilities of Bath City Council for parks, allotments, and cemeteries

- BC/22 Records of Bath Commissions. During the eighteenth century, Bath grew from a small market and spa town into a fashionable resort for the aristocracy and gentry - the tenth largest city in England. As a result, the provision of amenities such as paved streets, street lighting, rubbish removal and watching (policing) became an important issue, both for the convenience of the inhabitants and to serve their high-class visitors. However, the Corporation did not have powers to do this work or to raise money to fund it. In the first half of the century it obtained private Acts of Parliament to give it such powers, and tried to devolve the duties onto parish authorities. Both approaches met with limited success, and the Corporation turned to the solution adopted by other cities: the setting up of Commissions for specific purposes and covering specific, small areas.
- Daily Weather Diary 1750s-1760s
- The Record Office holds many deeds, including estate deeds, which record transfers of property and land and may include plans.
- We have an extensive collection of historic maps and plans (some general purpose, some made for a specific purpose such recording bomb damage of for fire insurance, and photographs.
- We have some sale particulars.
- Floods:
    - 1816 map with blue line showing the extent of the 1823 flood in Maps A drawer
    - Avon River box, including flood prevention 1824, 1877-78-80. No list
    - Photographs – Bath in Time plus PX series (PX 36, 37 – Avon Street. PX 89, 90, 91, 92 – Broad Quay, PX48 Back Street has previous flood levels annotated, PX49 also has level shown). Some PX photos annotated with flood levels. City Engineers Dept.
- BC/9/3/24/4 One volume includes minutes, accounts and bills relating to the distribution of coal.1879
- BC/9/3/24/19 Posters, bills, accounts, and correspondence relating to funds raised for the relief of the 1894, 1900 and 1901 floods in Bath
- BC/9/6/4/46 Mayor of Bath's appeal for funds for Flood Relief 8 files 1925-1968
- BC/9/3/24/2 Correspondence, accounts, minutes, and bills related to funds raised for the relief of 1875 flood in Bath Nov 1875 - Dec 1876

- 0128/2/4 Bath City Engineers Dept. Flood reports and related papers.
- 0128/2/2 Levels of the Great Flood 25 Oct 1882. Volumes listing markings of the water levels.
- Flood Fund in Funds and Subscriptions box Item 102
- Maps list S – Flood protection & prevention

Bedfordshire Archives & Records Service

- QS: Quarter Sessions
- Estate and manorial records
- PL, BorB: among local authority planning records and known to contain relevant material, though others may be useful (e.g. relating to highways or Luton airport).
- Z41 are business records for the Bedfordshire brick industry
- They hold some weather records in private collections including several series of farm diaries for different farms throughout the county, which tend to record weather in detail.
- Fonds A and MA are the enclosure records and the most heavily used records for considering the landscape as redeveloped by humans.

Expatriate Archive Centre

Due to the privacy restrictions it is unfortunately not possible to give names. But they do hold at least three papers of individuals who used to work for Shell in different countries which contain film footage and photographs.

- Fonds: British couple living in working in Venezuela (1962-1966) and Nigeria (1958-1962 and 1970-1971). Containing several series of films and photos.
- Fonds: British couple living and working in Nigeria from 1965-1967 and 1974-1981). Containing a video with oil tanker, nature etc.
- Fonds: Dutch couple living and working in the Dutch East Indies from 1945-146 and 1947-54. Containing several series with photographs about Shell work in nature.

East Riding Archives and Local Studies

- CSR: Commissioners of Sewers for the East Riding, 1587-1933

- DDTR/414-431: Commissioners of Sewers for Howdenshire and the west parts of the East Riding 1652-1861
- Internal Drainage Boards, example collections:
    - DDMW: Market Weighton Drainage and Navigation
    - DBCO: Cottingham Internal Drainage Board
    - DBGO: Goole and Airmyn Internal Drainage Board
- Quarter Sessions - Includes sporadic plans, petitions and indictments relating to flooding, example items:
    - QDP/61: Deposited plan for coastal improvements from Sunk Island to Spurn and Holderness Reclamation and Embankment Bill, 1866
    - QSF/51/D/20: Petitions of Peter Noble of Sunk Island for loss sustained by flooding, 1720.
    - QDU: undertakings including papers relating to drainage
- Board of Trade plans, 1830-1984 (ref: NBT), Board of Trade responsibilities included coast protection works, example:
    - NBT/22 Plan of proposed groynes, Spurn Head, 1864
- Current county council collection and predecessors:
    - Minute books
    - ERYC: East Riding of Yorkshire Council, example document: ERYC/4/1/1/26, Mar 1994-Nov 1998, Humberside flooding routine file
    - CCER: East Riding County Council, example documents:
        - CCER/4/2/3/4: Plan relating to Market Weighton Flooding, longitudinal section along Mill Beck, nd. mid-20th century
        - CCER/2/15/1/145: Storm damage and flooding at Paull file, 1953-1970
- Photographs- spread across various collections, example documents:
    - DDML/1/3: Photographs of flooding in George Street and Crescent Street, C.1900
    - DBCO/7/5: Hull floods photographs, 10 Dec 1937
    - DDX2226/3/77: Photographs of Pocklington Canal, 1998
- Parish council records, example documents:
    - PC55/76, Flooding and flood relief file, includes accounts for parish flood relief fund, correspondence, newscuttings and plans of erosion and flooded area
- Urban and Rural District Council records, examples:

  - Minute books
  - RDBR/6/8/5: Pumps and Sewers file 1909-1950, includes reports on flooding
- Maps and plans, examples:
  - CRW: Public Rights of Way Maps
  - OS: Ordnance survey maps
  - Enclosure awards and plans, spread across numerous parish collections
- Misc items e.g. DDX1282/20/11 Meteorological register for Beverley recorded by William Evans 1929-1935

University of Exeter Special Collections

- EUL MS 416: The Common Ground Archive

Common Ground is an arts and environmental charity, which was founded in 1982 to celebrate the relationship between people and everyday places and empower people to take care of their local environment. Common Ground has pioneered many innovative arts and culture projects to raise awareness of environmental issues. These projects have often involved collaboration with writers, poets, artists, sculptors, photographers, and composers. The output from the projects has included publications, artistic commissions, exhibitions, and events.

The Common Ground archive comprises a range of material created and collected by the charity in the course of its activities between 1982 and 2013. It includes correspondence, notes, financial papers, reports, press clippings, research material, photographs, audio recordings, sheet music, publications, and promotional material. Material in the archive is mainly organised into sections according to project, reflecting its original order and use at Common Ground. The Common Ground archive has rich potential for interdisciplinary research on a wide range of areas, including environmental studies, geography, literature, the visual arts, and business studies. Some possible areas of research are listed below.

  - Environmental issues in the UK - Research material relating to a range of environmental themes - including climate, pollution, deforestation, flooding, droughts, natural disasters, the use of pesticides, and habitat loss - can be found within the archive. The archive also includes records relating to responses to some of these issues and ideas for local conservation, as well as

reports, policies and strategies produced by the British Government, local authorities, and environmental organisations.

- Project planning - The archive contains project planning papers for each of its projects, from the early 1980s to 2013. This material includes project proposals, grant applications, meeting minutes, correspondence, and project reports. These records can be used to understand how arts and environmental projects are planned and organised, as well as provide insight into Common Ground's practices in particular.
- Sustainability - Common Ground has pioneered several projects that were designed to be sustainable, encouraging long-term environmental action without extra support required from the charity. The success of these Common Ground projects can be researched through reports, correspondence, and press clippings in the archive.
- Relationship between nature and culture - Research into archive material relating to the different projects can shed light on how Common Ground explored the links between nature and culture, especially through its commissioning of artwork, prose, music, and poetry, and organisation of cultural events.
- Sense of place - Sense of place has been explored by Common Ground through the concept of 'Local Distinctiveness', a term developed by the charity in the early 1980s to examine the relationship between places, people, nature, and identity. Correspondence, notes, essays, and promotional material relating to the 'Campaign for Local Distinctiveness' can provide more insight into the development of this concept.
- British culture and landscape - In its mission to raise awareness of what makes everyday places distinctive and unique, Common Ground collected a vast amount of research material on landscapes, wildlife, buildings, art, music, literature, customs, history, heritage, and folklore in Britain. This research material can be accessed through the archive.

King's College Cambridge

- KCAR/4/A/3: Mundum Books are annual accounts with sporadic hints about Cambridge weather: cost of rebuilding a bridge, or of building repairs or clearance of

fallen trees after strong winds; an entry c. 1860 in the Mundum Books for extra food for the pigeons during the cold winter. Described at: https://janus.lib.cam.ac.uk/db/node.xsp?id=EAD%2FGBR%2F0272%2FKC%2FKCAR%2F4%2FA%2F3

- KCAR/4/A/4: Other less complete series of accounts including 'cizations' will tell you how much was spent on fuel. Described at: https://janus.lib.cam.ac.uk/db/node.xsp?id=EAD%2FGBR%2F0272%2FKC%2FKCAR%2F4%2FA%2F4
- From about the 20th century there are College Annual Reports which sometimes include comments on weather events in the Domus or Gardens section.
- College estates papers have correspondence and accounts, see e.g. https://janus.lib.cam.ac.uk/db/node.xsp?id=EAD%2FGBR%2F0272%2FKC%2FKCAR%2F6%2F2%2F140 which was one of their larger estates. The Estates Admin files might have correspondence about damage costs or environmental issues.

Mundum books and estates records would often tell you how much the corn, barley and wheat was worth in any given year, from which you could begin to assume good and bad weather.

- Governing Body minutes 1772-1900 or so would record whether they gave their tenants a rent break and usually why (a wet summer e.g.). After about 1917 the Estates Committee minutes take over that job.
- There are also the Gardens Committee minutes from about 1966. Committee minutes are listed at: https://janus.lib.cam.ac.uk/db/node.xsp?id=EAD%2FGBR%2F0272%2FKC%2FKCGB
- BRD/129/7: administrative records that specifically mentions flooding in the description; about 3 other buildings management files also come up in a search for 'flood' in the catalogue. Described at: https://janus.lib.cam.ac.uk/db/node.xsp?id=EAD%2FGBR%2F0272%2FKC%2FKCAR%2FBRD%2F129
- GS/2/5: a personal papers collection from George Salt, someone very interested in the gardens and it can be used before Gardens Committee Minutes began, including a tree that fell over during a storm, falling on a streetlamp and causing a fire. Described at:

https://janus.lib.cam.ac.uk/db/node.xsp?id=EAD%2FGBR%2F0272%2FPP%2FGS%2F2%2F5

National Monuments Record of Wales

Nearly all their material/data can, in some way, be used for environmental research e.g.:

- Historic aerial photographs
- Modern aerial photographs
- OS mapping - all epochs
- Admiralty Charts
- Various other map collections
- CHERISH Project Archive
- Scheduling records
- Listed building records
- Excavation records
- Watching briefs
- Desk-based assessments
- Archaeological Reports/Evaluations/Investigations
- Uplands Initiative Archive
- Historic Landscape Characterisations
- West Coast Palaeolandscape Project
- Ynyslas Nature Reserve Survey Research Archive
- R. E. Kay Collection: a collection of notebooks recording historic sites etc

A full list of archive collections on a dropdown list at:
https://coflein.gov.uk/en/archive/search

University of East Anglia Archives

- LAMB (Collection) H.H. Lamb Archive: Lamb was a climatologist who founded the Climatic Research Unit (CRU) at UEA.
- GSC (Collection) Callendar Archive: Guy Stewart Callendar was an amateur meteorologist who developed the theory that linked rising carbon dioxide concentrations in the atmosphere to global temperature.

- Roger Deakin Archive: Deakin was a wild swimmer, writer and founder of this environmental pressure group which linked the environment with the arts.
- RD/ENV/3 Common Ground (File)
- Zuckerman Archive: Solly Zuckerman was a government Chief Scientific Adviser in the 1960s. His archive contains papers on scientific policy. He was also central to the establishment of the School of Environmental Sciences at UEA.
    - SZ/CF Conservation Foundation (Series)
    - SZ/CME Commission on Mining and the Environment (Series)
    - SZ/RCP Royal Commission on Environmental Pollution (Series)
    - SZ/WWF World Wildlife Fund (Series)
    - SZ/TF Tree Foundation (Series)
    - SZ/NRTC Natural Resources Technical Committee (Series)
    - SZ/UEA/9 University of East Anglia. School of Environmental Sciences (Series)
- Hill Papers John Edward Bernard Hill was an MP in the 1960s and a farmer.
    - JH/POL/LOC/28 Floods and coastal defences (File)
    - JH/BLY/2/20 Blyford flood protection scheme (File)

The Royal Society

- Meteorological archives (1706-1915)
- Papers of Howard Florey PRS (including papers concerning the Natural Environment Research Council)
- Audio Visual collection (recordings of Royal Society lectures on various subjects from energy, to water companies, pollution and animals' adapted behaviour and physiology in Antarctica to name a few - not all are environment related)
- Papers of Christopher Longuet-Higgins (including research on transport and the environment)
- Committee minute books, including minutes of national scientific committees and Royal Society convened committees, including British National Committee for Geology, BNC for Problems of the Environment, Environment Committee, Brian Mercer Innovation Awards Committee, Meteorological Committee, Gassiott committee on meteorological science, BNC on Antarctic Research, Joint Committee of Physics and Meteorology, Krakatoa Committee.

- Expedition papers (archives of royal Society expeditions from 1950s-1980s including Halley Bay, Antarctica 1956-1959, Aldabra marine research station 1967-1969)
- International Biological Programme records (1960s-1970s)
- Correspondence concerning biometrics between David John Finney FRS and Richard Cormack (1956-1997)
- Correspondence of Thomas Gold (includes his views on banning CFCs, 1990s)
- Archived Papers. Includes meteorological observations and observations of natural phenomena as well as descriptions of instruments used in environmental sciences. Paper submitted to the Royal Society for publication in their journals but not printed. Mixed in with papers on all branches of the natural sciences. 1768-1984)
- Classified papers: volume 4i, concerning 'Physiology, Meteorology, Pneumaticks' Papers on meteorological and astronomical topics. These works were sent to the Royal Society, usually by their authors or by intermediaries, for reading at ordinary meetings of the Royal Society and some went on to be published. 1661-1728
- Classified papers; Volume 5 concerning 'Weather'. Many of the papers record the weather for 1724, possibly in response to James Jurin's invitation for weather observations. These works were sent to the Royal Society, usually by their authors or by intermediaries, for reading at ordinary meetings of the Royal Society and some went on to be published. 1696-1724
- Classified Papers. Robert Hooke’s papers. Including on his interest in compiling a history of the weather. 1662-1669
- Classified papers: volume 21, Edmond Halley's papers. Including his interest in weather at sea, trade winds, and predicting weather as well as meteorology generally. These works were sent to the Royal Society, usually by their authors or by intermediaries, for reading at ordinary meetings of the Royal Society and some went on to be published. 1662-1669
- Classified papers; Volume 10 concerning 'Botany and Agriculture'.
- Papers of Charles Thomson Rees Wilson. Including his meteorological research. 1896-1910.
- Domestic Manuscripts volume 3. Minutes of a meeting of the Balloon Committee, 1837; for certain observations and experiments to be made in the higher regions of the atmosphere by means of an ascent in a balloon. Also Meteorological Instrument Committee, 1826-1839

- Letters and Papers. Accounts of a scientific nature submitted for publication by the Royal Society. 1741-1806.
- MS General. Diverse series containing all manner of papers by, about, or belonging to Fellows of the Royal Society. Including:
    - MS/2 Diary of Vesuvius observations by Antonio Piaggio. 1779-1795
    - MS/13 Works on botanical classification [by Nathaniel Matthew Wolf]. 1770-1771
    - MS/52 Tables of the pressure and force at varying wind speeds by an unknown author. 18thC
    - MS/62 The Marine Atlas. A New Invention for the Preservation of Ships and Security of Mariners. Humbly offered to the Public in its unfinished state, as an Excitement to Industry and Ingenuity. 1787
    - MS/92 Manuscript copy of 'Memoires of Naturall Remarques in the county of Wilts, to which are annexed observables of the same kind in the county of Surrey and Flynt-shire' by John Aubrey transcribed by B G Cramer. 6 June 1685
    - MS/102 Lists of observational hints and longer discussions of philosophical enquiries for voyages to the North Pole, in preparation for the expeditionary voyage commanded by Constantine John Phipps (1744-1794), later 2nd Baron Mulgrave. 1773
    - MS/119 Correspondence on Terrestrial Magnetism. 1833-1878.
    - MS/125 Papers on desalination by Zachariah [Zachary] Williams. 1753
    - MS/126 Scientific records from the 1818 Arctic expedition, by Edward Sabine.
    - MS/127 Descriptive lists of North American birds sent to the Royal Society by Humphrey Marten. 1772
    - MS/129 Notes on the fauna North America by Thomas Hutchins. 1772
    - MS/166 Illustrated album, 'Instruments of the Eskdalemuir Observatory', by Albert Edgar Gendle. C.1910
    - MS/169 Observation and Experiments to investigate by Chemical Analysis the Medicinal Properties of the Mineral Waters of Spa and Aix la Chapelle in Germany and of the Waters and Boue at St Amand in French Flanders. By John Ash. 1788
    - MS/170 Documents relating to Mr Lloyd's paper on the difference of level of the Atlantic and Pacific Oceans. 1830

- MS/209 Notes on Instruments, with illustrations of solar phenomena and cloud observations.
- MS/215/17 Figures observed in Snow, by Robert Hooke. 1662
- MS/222 Reports on excavations at Kent's Cavern by William Pengelly and Edward Vivian. 1865-1880
- MS/224 Report on the Neapolitan Earthquake of 1857 by Robert Mallet. 1858
- MS/225 Illustrations of the Great Neapolitan Earthquake, by various artists. 1857-1858
- MS/228 & MS/232 Thames Levelling Commission. The original observations of levels. 1830
- MS/233 Operations connected with the Levellings carried across the Isthmus of Panama by John Augustus Lloyd. 1882
- MS/236 Drawings by Richard Spruce of scenery and local people throughout the Amazon and Orinoco river systems. 1850-1863
- MS/238 Sir Robert Southwell's Lecture at the Royal Society About Water. 8 Apr 1675
- MS/239 Arctic expedition journal, by Edward Sabine. 1818
- MS/246 Robert Moray Papers. They include accounts of chemical experiments in his laboratory, his interest in magnetism, medicine in all its aspects, horticulture, fuel, whale fishing, its risks and profits, coal mining, water wheels and tide mills, stone quarrying and the various qualities of different stones, the pumping works needed for undersea coal mines at Bruce's home at Culross in Fifeshire, even to the trees whose wood was best for pipelines, and the diameter of the bore best suited to the purpose. 1657-1673
- MS/265, 282 & 312 Sunspot observation from Kew Observatory. 1864-1872
- MS/505 Letters and Papers of the Food Sub-Committee of the Physiology (War Committee)
- MS/506 Letters and Papers of the Grain Pests Committee
- MS/508 Letters and Papers of the Gassiot Committee (for meteorological science)
- MS/511 Letters and Papers of the Water Research Committee. 1891-1896
- MS/516-MS/523 Krakatoa Committee papers.
- MS/527 Letters and papers of the Food War Committee. 1916-1919
- MS/547 Papers relating to the National Antarctic Expedition. 1898-1904

- MS/619 Miscellaneous Papers on sunspots of Warren de la Rue, FRS
- MS/683 Lubbock Papers, papers of Sir John Lubbock, naturalist and archaeologist, and his son's notes on natural history. 1852-1914
- MS/698 Photographs by Charles Piazzi Smyth of 'Cloud Forms that have been at Clova, Ripon'. 1982-1895
- MS/708 Dominica Expedition Committee, West Indies Seismological Committee, Committee on Volcano-Seismic Observations in the Windward and Leeward Islands. 1938-1951
- MS/713 Effect of temperature on the strength of railway axles by Thomas Andrews. 1886-1888
- MS/787 Papers on natural history of Henry Bowman Brady. c1835-1891
- MS/793 An account of the Mato Grosso based on the Royal Society and Royal Geographical Society expedition to central Brazil in 1967-1969 by Anthony Smith.
- MS/807 Letters from the Peruvian Andes, by Joseph Barcroft (studies on high altitude
- MS/808 Thesis 'The glacial deposits west of the Taff, South Wales' by John Cedric Griffiths. 1904
- MS/816 'An Account of my Doings 1924-1966' by George Salt, ecologist
- MS/826 Studies of Soil and Litter Fauna in the British Soloman Islands Protectorate. Summary of work carried out November 1964 - August 1965
- MS/845 Records of the eruption of the Mount Tarawera volcano, New Zealand, by James Hector. 1886
- MS/851 Coral atoll field notes [Maldives] by Robert Beresford Seymour Sewell. 1923-192
- MS/856 Documents relating to the Royal Society expedition to the Solomon Islands in 1965 and to subsequent work in Australia. Includes a large number of photographic slides.
- MS/860 Remarks on rainfall among the Cumberland mountains for the year 1869 and on evaporation, by Isaac Fletcher
- MS/875 Illustrations of molluscs by Alastair Graham FRS (1906-2000) and others
- MS/878 The Aldabra Research Station in the Seychelles

    - MS/887 Copies of material relating to Maskelyne's Schehallien Experiment of 1774
    - MS/908 Field notebooks of Dr Stephen T Trudgill relating to the Royal Society's Aldabra expedition. 1969
    - MS/891 Photographs of Chernobyl, of Sir Frederick Warner. 1990-1994 (show the sire being 'reclaimed' by nature)
    - MS/908 Field notebooks of Dr Stephen T Trudgill relating to the Royal Society's Aldabra expedition. 1969
    - MS/910 Collected papers of scientific content for the Illustrated London Almanack, edited by James Glaisher. 1845-1857
    - MS/927 Experimental notebook of Phillip Sadler Nutman on 2,4-dichlorophenoxyacetic acid (herbicide) research at the Rothamsted Experimental Station. 1941-1995
    - MS/935 Correspondence concerning biometrics between David John Finney FRS and Richard Cormack. 1956-1997
- Journal Book of the Royal Society. Minutes of meetings of ordinary meetings of the Royal Society including records of papers read and discussions. 1660
- Civil and mechanical engineering designs by John Smeaton 1741-1792. Includes designs for waterworks such as canals, sluices and harbours.
- Notebooks and drawings of Janis Antonovics, biologist whose studies include natural plant populations and tolerance to heavy metals. 1950-1970

Appendix V: Guide for environmental research at the Staffordshire Record Office

This guide is designed to support researchers at the Staffordshire Record Office interested in topics related to the environment. It will suggest potentially relevant archive material, however many useful records were not created to record the environment and therefore will not be obvious choices for environmental research. In recognition of this, this guide will also recommend ways of searching the archive catalogue (Gateway to the Past) to find further relevant material.

What can I view online?

Most records held by the Staffordshire Record Office will need to be viewed in the reading room. For up-to-date information on visiting the record office, see: https://www.staffordshire.gov.uk/Heritage-and-archives/contact/Planning-a-visit.aspx

There are some online digitised records which might be useful for environmental research:

- Staffordshire Past Track is managed by Staffordshire County Council's Archives & Heritage Service. It allows you to search for photographs, images, maps, and documents. It includes photographs and other images of flooding, snow and storms and the theme explorer includes a section on *Floods, Droughts & Weather Damage*. http://www.staffspasttrack.org.uk/
- Parish registers are online with Find My Past. The search interface does not allow free text searching, so it is not possible to search for weather events. Instead, you will need to browse through the pages of parish registers. https://www.findmypast.co.uk/
- The *TEMPEST* database was produced by a collaboration between the Universities of Nottingham, Aberystwyth, Glasgow and Liverpool on the project *Spaces of experience and horizons of expectation: the implications of extreme weather events, past, present and future*, it contains details of extreme weather events in the UK over the last 500 years based on material from UK archive repositories, including the Staffordshire Record Office. https://www.nottingham.ac.uk/geography/extreme-weather/search/

For further information about digitisation, see: https://www.staffordshire.gov.uk/Heritage-and-archives/Collections/DigitisationProject.aspx

Searching Gateway to the Past

Gateway to the Past is the online catalogue for the Staffordshire and Stoke on Trent Archive service and contains description of the records of the Staffordshire Record Office, the Stoke on Trent City Archives, the William Salt Library, and the Staffordshire County Museum. As there are many useful records that are not "about" the environment, a simple keyword search may not reveal everything that would be relevant for research. Multiple different terms may be necessary (e.g. flood, floods, flooding, flooded). Terms may also produce a small number of false hits. For instance, "flood" might find mills' floodgates and "storm" can produce storm welts (a technique in shoe and boot making). It can be more helpful to search in ways that will help to find material that does not directly mention the environment. This might mean looking for human intersections with the environment (for example, "bridge" returns more results than "river"), searching for specific types of record, around dates of known events (such as a major flood that occurred in 1795), or for places.

Key collections

The material suggested below is only a starting point, and it is likely that there are other possibilities within the Staffordshire Record Office that are not listed here. The material here is listed with the relevant collection letter code (or reference number for individual items).

For a more general guide to key collections held by the Staffordshire Record Office, see: https://www.staffordshire.gov.uk/Heritage-and-archives/Collections/keycollections.aspx

Local government and administration

Quarter sessions: Q/

The Quarter Sessions were county courts that met four times a year and held responsibility for both civil administration of the county and trying criminal cases. The civil functions of the courts have resulted in records of maintenance of infrastructure, records relating to natural resources (such as woodlands) and responses to environmental events such as floods, storms, and severe snow. The earliest records held by the Staffordshire Record Office are presentments and indictments of recusants from 1581. There are consistent records through the seventeenth to nineteenth centuries and records continue sporadically

into the twentieth century. The Quarter Sessions have been the subject of a long-running volunteer cataloguing project, so many of the records (although not all) have detailed entries that may help them appear in search results.

Manorial records

Manors were the lowest level of feudal court with powers to regulate torts (civil wrongs), contracts and land tenure. Because these responsibilities affected agriculture, infrastructure and resources, manorial records often contain information about management of the environment. Many manorial records (particularly earlier ones) are in Latin, although later ones (roughly from the 16th/17th century onwards) are more likely to be in English. The best way of identifying manorial records is using the Manorial Documents Register: https://discovery.nationalarchives.gov.uk/manor-search

Parish Records

Parish records exist from the 16th centuries. Parish registers record births, marriages and deaths, but many (though not all) also contain notes on major events or other matters that the writer thought worth noting, which can include weather events. Parish registers that are known to contain useful information include Alrewas for 1547-1747 (*Annales Aldervasenses*, D783/1/1/1) and Wombourne (D3710/1/1).

Guides to parish records are available: https://www.staffordshire.gov.uk/Heritage-and-archives/publications/GuidestoSources.aspx

Staffordshire County Council: C/

With the Local Government Act of 1888, Staffordshire County Council took over responsibility for the administration of the county from the Court of Quarter Sessions. County Council records are less thoroughly catalogued than the Quarter Sessions records so will not be easily found by searching for keywords. However, they are likely to include information relevant for an environmental researcher.

Sections that might be of particular interest:

- Property (Estates and buildings): C/A

Including plans of council property, records of county farms and photographs of sites and buildings.

- Planning and Development: C/P
  Including surveys of land use and rights of way, county and regional planning, archaeological records, ecological surveys, maps and plans, and aerial photography surveys.
- Health: C/H
  Including environmental and public health surveys and data collection.
- Highways and Bridges: C/Rd
  Including county surveyors' reports, registers of bridges and culverts, maps and plans

Water authorities

Staffordshire Potteries Water Board: D3023, D3742, 6763, D7273, D7458/2

The Staffordshire Potteries Water Works Company was formed in 1846 and merged into the Trent River Authority in 1974.

Trent River Authority and the Severn Trent River Authority: D7458/1

The Trent River Authority was created in 1963, taking over the powers of the Trent River Board as well as responsibility for pollution and water quality.

Estates

Running estates involved many concerns relevant to the environment (landscaping, agriculture, property management, responding to environmental events, etc.). The administration of estates can therefore include a great variety of different records with environmental information, including accounts, legal papers, or maps and plans. Estate collections can also contain personal papers (such as diaries and correspondence) which might be of further interest.

Notable estates include:

- Dukes of Sutherland (Leveson-Gower): D593, D868, D6578, D6579

Along with property in other counties, they owned property in Willenhall and Wolverhampton from the 13th century and further property in Staffordshire acquired from the 16th century onwards

- Marquesses of Anglesey (Paget): D603, D(W)1511; D(W)1734, D(W)1821, D894, D1282, D3000, D3078, 3326, 3614, D4616, D4648, D4793, D5086, D5377, 6029, D6058
  Along with property in other counties, they owned various property in Staffordshire from the 16th century onwards, including Abbots Bromley and Burton. They later acquired Longdon, Haywood, Cannock and Rugeley
- Earls of Dartmouth (Legge): D(W)1778, D(W)515, D564, 575, D742, D761, D853, D1501, D1517, D3074, D3137, D3629, 3758, 4802, D4544, D5128, D5172
  The Legge family rose to prominence after the English Civil War. Staffordshire estates included West Bromwich.
- Earls of Lichfield (Anson): 508, D615, D895, D1240 pt., 1342, D(W)03, D(W)1474, D(W)1748, D(W)1765, D(W)1840, 3848, D5763, D5800, D6120, 6276
  The Ansons originated in Dunston and the first records date from 1644, and Shugborough was their principal residence.
- Lords Stafford (Stafford/Jerningham/Fitzherbert): D397, D641, D(W)1721/1/1-12, D1810, 766, D3143, 3273, 5442, D6249, D6809, 7047, 7798
  There is some discontinuity in the Lords Stafford collection, however there are records from as early as the 11th century.
- Lords Bagot (Bagot): D453, 623, 728, 793, D986, 1404, D(W)1721/2-3, D3071, D3108, D3259, D3260, 3943, D4038, D4381, D5121, D6557, D6714, 6735
  Records of the Bagot family of Blithfield range from the 12th to the 20th centuries.
- Lords Hatherton (Littleton): D(W)0/7, D260, D1121, D1178, D1413, D4028, D4787, D5378, 7217, D7228
- The Littleton family of Teddesley and Hatherton records range from the 12th to 20th centuries and include property in Walsall, Penkridge and Cannock

Further resources

- Staffordshire County Council historic environment resources (including HEAs): https://www.staffordshire.gov.uk/environment/Environment-and-countryside/HistoricEnvironment/Overview.aspx

Related guides:

- Land ownership: https://www.staffordshire.gov.uk/Heritage-and-archives/Local-and-community-history/Land-Ownership/Land-Ownership-Introduction.asp
- Landscape and maps: https://www.staffordshire.gov.uk/Heritage-and-archives/Local-and-community-history/Landscape/Understanding-Landscape-Introduction.aspx
- Local history: https://www.staffordshire.gov.uk/Heritage-and-archives/Local-and-community-history/Local-History-Guide.aspx
- Staffordshire Place Guide: https://www.staffordshire.gov.uk/Heritage-and-archives/Local-and-community-history/placeguide/Staffordshire-Place-Guide.aspx
- Victoria County History of Staffordshire: https://www.staffordshire.gov.uk/Heritage-and-archives/Local-and-community-history/victoriacounty.aspx

Available publications:

- County maps: https://www.staffordshire.gov.uk/Heritage-and-archives/publications/CountyMaps.aspx
- Guides to sources: https://www.staffordshire.gov.uk/Heritage-and-archives/publications/GuidestoSources.aspx
- Local histories: https://www.staffordshire.gov.uk/Heritage-and-archives/publications/LocalHistories.aspx
- Maps and topography: https://www.staffordshire.gov.uk/Heritage-and-archives/publications/GuidestoMapsandTopography.aspx
- Ordnance Survey maps: https://www.staffordshire.gov.uk/Heritage-and-archives/publications/OrdnanceSurveyMaps.aspx
- Parish maps: https://www.staffordshire.gov.uk/Heritage-and-archives/publications/ParishMaps.aspx
- Victoria County History reprints: https://www.staffordshire.gov.uk/Heritage-and-archives/publications/VCHReprints.aspx

Appendix VI : Transcription of interview with an archivist from the Staffordshire Record Office

Interview conducted via telephone 09/05/2020 15.52

[recording unclear, verbal consent was confirmed]

Me: It was sort of questions about both the volunteer project Alice and I were doing but also other projects with universities or Higher Education Institutions?

[break to move to better reception]

Me: So, the first question was why the record office has pursued or agreed to collaborative projects with universities or with Higher Education Institutions, more generally, not specifically the *flood and drough*t one.

Archivist: [unclear] the main one is that we've always had relationships with academics, very often with established academics rather than with PhD students. What we've tended to do is just work sort of ad hoc with them when something just comes up, and not in an organised way. So although in the past we've done some good things with academic partners, it's been more "oh, you can do some work on this can't you, can you help us out with this?" or an academic saying "would you mind if I brought a group of students in just to look at this?" and basically, we wanted to formalise that and make it less ad hoc and more planned. The other thing was that in order to do any kind of sustained project with an academic you need some money and as far as universities are concerned, someone like us isn't their first spending priority, but if we can apply jointly for external funding, then we have much more of a chance of getting a good project going, so something meaningful rather than just quick. And it's particularly good for volunteer projects – can you hear all of this? [unclear] because you can have a sustained period of time with somebody that's interested in the work that the volunteers are doing and somebody that can, you know, be there to answer their questions, share their enthusiasms, take them in the right direction, rather than having, um, maybe somebody who's [unclear] staff that doesn't know in detail about the material that they're looking at. Because a lot of our volunteers, although we do try to get a range of volunteers, a lot of our volunteers are pretty high on the intelligence scale, and so it's good for them to feel stretched by people with their specialist knowledge

and also they often, because our volunteers tend to be older, they often come with a very strong set of skills um, and it's good to be able to make use of their skills and help them to develop their skills further, and we generally wouldn't have time to do that on our own. But you know that work you did with Richard, for example that's somebody who had a strong skillset um but just needed something to do with it. Which is what you gave him.

Me: And I was thinking, sort of I had, when I did that survey I had quite a few of them comment about things like the palaeography workshops and that they're ... sort of, quite like getting to do things like that.

A: You mean skill building?

Me: Yeah

A: Yeah, um, actually I don't know if this is going to be a bit off-topic for you, but during this lockdown, we've been doing a lot with our volunteers, we've set up an e-learning blog with palaeography [unclear]

Me: Oooh, I saw that

Yeah, cause the coronavirus has definitely changed a couple of things I'm saying about working with volunteers, because there's been a couple of projects that have done things slightly differently with volunteers, there's um, *Weather Rescue* at… Edinburgh? And it's getting people to transcribe things and its altered how they're working and got a huge uptake because of people being at home going "ooh, it's a thing I can do"

A: Yeah, they finished it in ten minutes, some of our volunteers started doing it and so they didn't have enough work for them beyond a week

Me: I've had that problem with my sewing volunteers[…]

A: Anyway, I think that would be something that would be good to look at because it's the kind of thing that had we had more time for you we would have been doing more of but now because we've had this period of time, we've got it up and running very quickly, but there's some really good stuff there. Have you interviewed [name]? She … a couple of our volunteer groups [cuts out]

…

New call commenced 16.03:

[beginning not captured]

A: the bawdy courts project and the place names group who were working with Nottingham university [H: oh, that's how I've heard her name]

A: She's been doing some really good work in volunteer training, so she'd be a very good person to talk to

Me: Yeah

A: So, she set up our learning blog, and she's also doing some online palaeography classes. So her email address is [email]

Me: My next question was… so I asked *why* the record office pursued projects like this, but what did you hope to get from them more specifically?

A: Your specific project? Or generally, what did we hope to get out of them?

Me: Generally, and then specifically *Flooding and Drought.* It's useful top have both so I can compare.

A: So generally, its an opportunity to enhance the work that we're doing… by… that we would be doing anyway by working with the academic community, so it's sort of almost network building and knowledge building. So that's one, the other thing I'd say is that (I've never really formulated this by the way, it's more Matthew's kind of thing than mine) but the other thing that we hoped, and I think I said this on the previous question, is that we hoped to be able to sort of punch above our weight. We have a small staff but working in partnership with universities means we can take on more adventurous projects. Erm, which not only enhances our reputation within our organisation, which is actually quite an important thing for us, but it also means that we can build on relationships to reach out and get new ones, I guess.

Me: That makes sense, and how about specifically with the University of Liverpool with the *Historic Flooding and Drought*?

A: Well, that one was a completely new kind of venture for us, because we've only ever really worked with historians before and this was the geography department. So, it was interesting to try something new. And, you know, it has been an interesting project, a good project. But it didn't turn out to be what I expected it to be. It became, our main focus, our benefit for us, and a really good benefit, was a great volunteer project, which the volunteers enjoyed. What we set out to do, was a catalogue enhancement project, and that didn't really work, not through really any lack of effort on either your part or Alice's part. It's just that when the University of Liverpool approached us, they said "yes, you'll have loads and loads of material that we can use, yeah, you've got manor court rolls, you've got this, you've got that, that's all really good." But in fact, it wasn't what either you or Alice wanted to look at. So, when it actually came down to it, the kinds of work we were expecting to get out of it didn't materialise. And that was also because partly, I don't think our collections, well, our collections weren't accessible enough, because most of the interesting material was very early and in Latin, and the later material there were pockets of really interesting stuff, but we didn't have any sort of "gem" collections, like diaries that had lots of material for you. So, although we got lots of interesting things out of it, it wasn't what we were expecting. So, I was expecting that the volunteer group would be something of a by-product of the catalogue work, but in fact the main work was the volunteer work, and the catalogue enhancement was a by-product of it. So, the two things swapped emphasis. And I think that it might have been, the reason it worked out like that might have been that we were working with – I know they were historical geographers – but they weren't sort of, academic historians as such. And I think they were much more confident that our material would be what was wanted than actually turned out to be the case. But it was interesting, and in a way, to us, it didn't matter, we got a lot of benefit out of it. And I hope it wasn't too much of a struggle for you and Alice!

Me: No! Well, it was a PhD. I do genuinely really miss the record office at the moment actually, so, I kind of wish it was closer. So, this might end up getting a bit repetitive, because you've sort of already answered this. What benefits have you experienced from projects with universities, with HEIs? And have they matched up to your hopes for these projects? This is in general, not specifically us.

A: Well, I think generally, including yours, they've given us huge benefits. The first is, um, an injection of – I'll say funding, although the funding didn't come to us – the injection was of your time, so it's an injection of academic time into the projects is what we benefit from.

So, for example, in the past we've had large collections that have been made accessible through the online catalogue because of joint projects. So, one example we had was someone doing an industrial archaeology- no, not archaeological. I can't think how to describe it actually – well, basically a nineteenth-century, industrial revolution, fairly classic type PhD but along the way, that postgrad catalogued a large collection that we'd set out a framework for. So that collection became accessible, and it also led to, because of that we were able to build on that and get another grant to employ an archivist to spend 1 ½ years on another project. So, I think we get actual benefits during the time of the academic project, but because that's allowing us to deliver outputs beyond our normal capacity, it gives examples to point to as being somebody reputable to give funding to for further projects. And a lot of our cataloguing work now is almost entirely reliant on external funding. So, the project with Liverpool, I suppose you could say was reputation enhancing. I think the other thing to bear in mind, although I have already said this, is that the volunteers get a lot more out of volunteering when they're being led by an academic.

Me: You've said that, and I definitely got that from the survey I did of them. Them going "ooh, this is novel, and interesting"

A: It's stretching, isn't it? Not just them indexing a load of stuff, its actually they've got some academic input. And even if they're not doing anything that's desperately difficult themselves, they know that they're feeding into something very challenging and they're hearing about it.

Me: Have there been any unexpected benefits? Anything that you weren't anticipating?

A: Ooo, probably. There's bound to be, isn't there? I just can't think at the moment.

Me: No worries, I was just thinking things don't always quite go as you expect, so if there's anything you-

A: I suppose with your project, the unexpected benefit was that we got a load of quite poorly described deeds, described really well! And we weren't anticipating that at all! [laughter]

Me: Yeah, well I didn't anticipate becoming so interested in title deeds.

A: I'll have a think about that as we're talking, there must be stuff, it's just a bit of a blank. Oh, I suppose another benefit that I haven't mentioned is the development of our technological cap- our IT capabilities. So, for example, two of our projects are the volunteers are doing online inputting so they can do a certain amount from home. They can take lots of notes and type it all up at home, rather than having to laboriously do it in the record office. So, in a kind of mercenary way, we're getting extra hours out of them! But in another way, is developing our capability to do things at a distance because we're gaining knowledge of different programs and how they work. So that's probably what we might say was a bit of an unexpected benefit. We weren't anticipating that, but it's happened.

I suppose the other thing is that because we've got good relationships with univer- you know, some of the local universities – we're sometimes used for an academic to try something out and then apply for more funding for a bigger project, which we then benefit from. So, we certainly have experience of that. That's why building relationships is so important. Because you've become a trusted partner, does that make sense?

Me: Yeah. I'm just noting that down.

A: Do you want me to go over that again?

Me: Yeah, that would be helpful. So, because you've got good relationships –

A: Yeah, so because we've developed the relationship, that means we're a trusted partner for a university, and we can supply them with a group of volunteers to try something with and they can then put that forward as an example of pre-research they've done in preparation to apply for a big grant, which we then benefit from. So, the pauper project did that. It started off as a small Staffordshire project, and now it's got three county record offices involved and a big research team.

Me: So, things start as someone going "I wonder if…" and they become a much bigger opportunity sometimes?

A: Yeah, exactly.

Me: That's actually really helpful. … It's nice when things back up stuff you're already writing! How about – are there any way these projects **haven't** achieved what you hoped?

Or any problems or obstacles? Both in general and with *Flooding and Drought,* any issues you've had -

[recording cuts out]

-

Summary of response to final question:

The archivist noted that *Flooding and Drought* had "two strands and they swapped emphasis," although the record office still saw benefits. Pre-existing relationship building helps with projects. The only thing that would be a problem is that the archive staff might not have time to support projects, which was a concern with *Flooding and Drought*. However, I said that we did feel that we had been given sufficient support.

Appendix VII : Volunteering at the Staffordshire Record Office, text of unpublished report (2018)

Section A: The projects you volunteer for

1: Which volunteer projects are you currently part of?

The survey asked volunteers to identify which projects they were involved with so that any effect that the different projects and styles of project could be used to understand the results better. Some projects involve more volunteers than others, so it is unsurprising that the project yielding the most responses was the *Place-name* project, which has a large number of volunteers.

The survey responses by project are as follows:

1: Which volunteer projects are you currently part of?

Projects	Responses
Magistrates Records	4
Quarter Session Records	6
Victoria County History research group	4
Place-name research project	11
Historic flooding and drought in Staffordshire	6
Pauper Biographies/Poor law vouchers	4
Criminal Quilts	4
Parish rights of way	4
Gothard Diaries	2
Littleton letters	1
Stafford at war 1914-18	1
Consistory Wills	2

Thirty-two surveys were completed, but as many volunteers with the Staffordshire Record Office are involved with more than one project at a time, this question had forty-nine responses. Over a third (38%) of individuals indicated that they were involved in more than one project, and one individual reported taking part in four projects.

Number of simultaneous projects volunteers are involved in

No. of projects	Individuals	
1	20	(62%)
2	8	(25%)
3	3	(9%)
4	1	(3%)

For a number of volunteers, the Staffordshire Record Office appears to form a significant part of their lives and weekly routines, in some cases giving substantial amounts of their time each week to the record office.

2: Have you volunteered for the Staffordshire Record Office prior to the project(s) you are currently involved in?

One purpose of the survey was to determine how motivated volunteers are to continue volunteering when a project ends, and to understand how many volunteers are new to the record office, and how many might be considered experienced, long-term volunteers or "regulars." When asked whether they had volunteered for a previous project, the responses were divided exactly between sixteen new volunteers and sixteen people who had volunteered in the past.

This is extremely promising for the Staffordshire Record Office as it shows both an existing body of experienced volunteers who are willing to continue from one project to another, and a large intake of new volunteers. It's also worth noting that three of these "new" volunteers indicated that they were involved in more than one project, suggesting a great deal of enthusiasm for volunteering from any new intake.

Volunteers listed involvement in a number of previous projects and record office material, including: the Sutherland papers, workhouse registers, RAF histories, tithe maps, the *Chase Through Time* project, the manorial documents register, Bridgeford deeds, the reader card database, marriage bonds, diocesan records, jurors' records, coroners' reports, and WWI tribunal

3: Approximately how long have you been volunteering with the Staffordshire Record Office for?

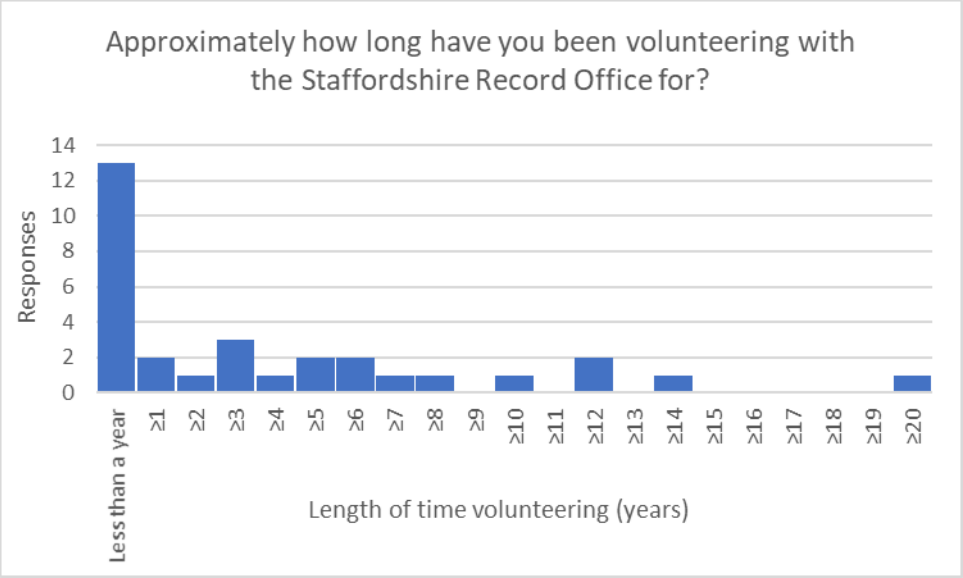
Duration of volunteering	Responses	
Less than a year	13	(41%)
1 - <2 years	2	(6%)
2 - <3 years	1	(3%)
3 - <4 years	3	(9%)
4 - <5 years	1	(3%)
5 - <6 years	2	(6%)
6 - <7 years	2	(6%)
7 - <8 years	1	(3%)
8 - <9 years	1	(3%)
9 - <10 years	0	
10 - <11 years	1	(3%)
11 - <12 years	0	
12 - <13 years	2	(6%)
13 - <14 years	0	
14 - <15 years	1	(3%)
≥20 years	1	(3%)
No response	1	

records. Some answers indicate that volunteers may have left a project or moved to a different project at some point as the *Quarter Sessions*, *Victoria County History research* and *Place-Names* projects are all also mentioned. The survey did not ask volunteers about whether they ever had left a project before its completion, so further details are not known, and reasons for leaving or changing projects could be as simple as personal time constraints or changing circumstances.

3: Approximately how long have you been volunteering with the Staffordshire Record Office for?

Question 2 is not a completely reliable indicator of which volunteers are "new" to volunteering at the Staffordshire Record Office and which are not, as projects vary in length from a few months to ongoing ones lasting several years. The sixteen responses who answered "no" to question 2 ("Have you volunteered for the Staffordshire Record Office prior to the project(s) you are currently involved in?") reported having volunteered for periods from two months up to three years, plus one who reported a previous twelve years at Lichfield Record Office. (the individual who stated a period of three years also reported being involved in three current projects), Meanwhile, three volunteers who said they had been involved in previous projects reported having started within the last two years. These people had possibly started at the end of a previous project (one named the *Chase Through Time* project) or started one project but moved to another.

As the longest period recorded by a volunteer who had not been involved in any prior projects was three years, volunteers who have been with the record office for more than three years will be considered regular or "established" volunteers. Meanwhile while volunteers who have been with the record office for three years or less will be considered recent or "new" volunteers for the sake of further discussion (although volunteers who have been on a project for three years are arguably not "new" to volunteering).



As with the answers to question two, a core group of very experienced, long-term volunteers is indicated, along with a sizable recent intake. It's worth noting the variety of projects that these new volunteers represent. The projects in which new volunteers outnumber established ones are all projects involving visiting researchers/project coordinators, or partner organisations: Victoria County Histories, The University of Nottingham (*Place-Names*), The University of Liverpool (*Flood and Drought*) and Ruth Singer (*Criminal Quilts*). This may be accounted for by the ability for these projects to advertise for volunteers through channels not usually accessed by the Staffordshire Record Office such as a partner organisation's emailing lists. The Staffordshire Record Office's own advertising, through the newsletter and social media is likely to mostly reach people already aware of volunteering at the record office, including existing volunteers and regular users, while a partner organisation might reach people unfamiliar with the record office. It also might be due to the novel nature of these projects appealing to different people, particularly in the case of the *Criminal Quilts* project which focused on artistic outputs rather than traditional archival or research activities.

Numbers of "established" and "new" volunteers by project

Projects	Established volunteers	New volunteers
Magistrates Records	3	1
Quarter Session Records	5	1
Victoria County History research group	0	4
Place-name research project	3	8
Historic flooding and drought in Staffordshire	2	4
Pauper Biographies/Poor law vouchers	3	1
Criminal Quilts	1	3
Parish rights of way	3	1
Gothard Diaries	1	1
Littleton letters	0	1
Stafford at war 1914-18	1	0
Consistory Wills	1	1

Projects where new volunteers outnumber existing ones are highlighted in orange

4: Do you do voluntary work for any history or heritage organisations other than the Staffordshire Record Office?

Of thirty-two responses, eleven said they do voluntary work for history or heritage organisations other than the Staffordshire Record Office, while twenty-one said they do not.

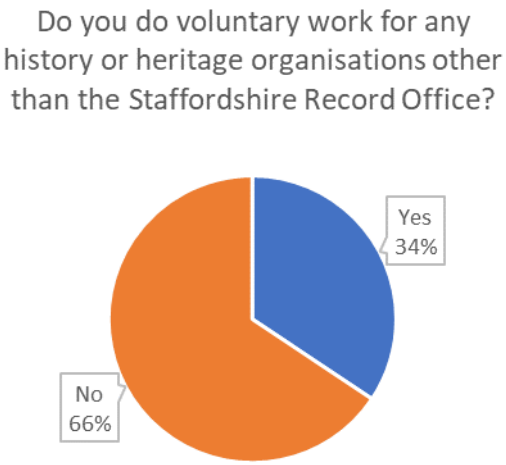
Organisations listed by volunteers include the committee for FoSSA, the Staffordshire Archaeology and History Society, Duke of Edinburgh's Award, Keele University, SCC Archaeological department, Newcastle-under-Lyme museum and English heritage properties. Activities described by volunteers include article writing, tutoring in Latin and palaeography, curatorships, report writing, transcription, guided tours, committee positions, youth leadership roles and general management responsibilities.

The extent and variety of these voluntary activities suggest that a significant proportion of Staffordshire Record Office volunteers are deeply invested in their wider community. This may be a significant motivator behind their decision to volunteer for the Staffordshire Record Office. New volunteers are nearly twice as likely to volunteer elsewhere, with eight (42% of a total nineteen) of the new volunteers volunteering for other organisations, and three (23% of a total thirteen) of the established volunteers volunteering elsewhere. This may be simply because the record office is now an important part of a weekly routine for

established volunteers, while newer ones are more likely to have been actively seeking volunteering opportunities recently.

Numbers of new and established volunteers volunteering elsewhere

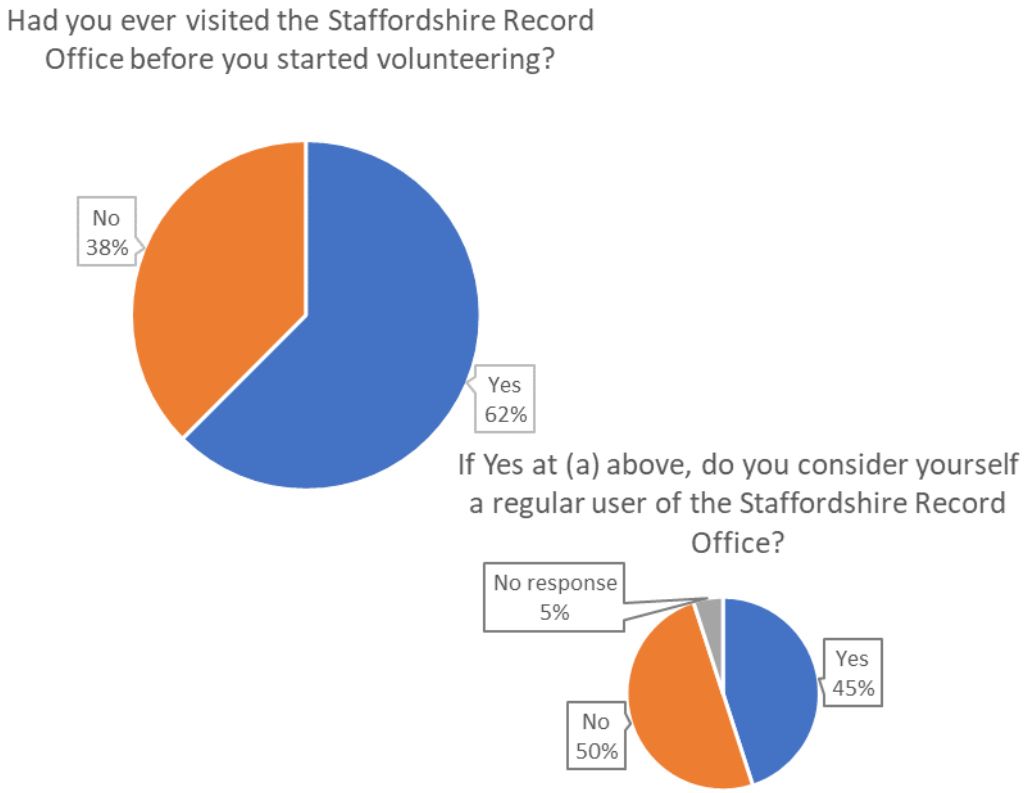
Q4. Answer	Established volunteers	New Volunteers	Total
Yes	3	8	**11**
No	10	11	**21**



Section B: The reasons you volunteer

5: Had you ever visited the Staffordshire Record Office before you started volunteering?

It was asked whether volunteers become involved with the Staffordshire Record Office as existing users of the archive service (who might have already developed an attachment or loyalty to the record office), or if they are new to the record office and seeking volunteer opportunities. Twenty responses (62%) said they had visited the record office before becoming a volunteer, of whom nearly half said they consider themselves regular users of the Staffordshire Record Office. Thirteen of the new volunteers said they had visited the record office before volunteering, of whom five consider themselves regular users and seven do not (and one did not answer).



It is interesting that half of the volunteers who had visited the record office prior to volunteering do not consider themselves regular record office users, and it would perhaps be worth considering how volunteers might view the distinction between a volunteer and a user. Certainly, many (but not all) volunteers pursue their own research (see question 7 below). Volunteers who had not visited the record office before volunteering should have possibly been asked whether they now consider themselves regular users. Nearly half (46%) of the established volunteers said they had not visited the record office before volunteering, but as long-term volunteers these individuals may now consider themselves regular users.

6: How did you hear about the project(s) you are part of?

6: How did you hear about the project(s) you are part of

Media	Number	
Newsletter	6	19%
Twitter	2	6%
Facebook	1	3%
A blog for the project	1	3%
Word of mouth	9	28%
Other	16	50%

There are multiple ways in which volunteer projects are advertised, including the Staffordshire and Stoke on Trent Archive Service social media, so volunteers were asked how they had heard about their projects, with the option to select more than one answer.

While the newsletter is certainly an effective way of recruiting volunteers, many more appear to hear about their projects through word of mouth. This is probably accounted for by the number of returning volunteers, who may have heard about a new project while already volunteering. Social media and blogging accounts for very little volunteer recruitment, and none of the established volunteers said that they found their projects through Twitter, Facebook or a project blog.

Among "other" means of hearing about projects, new volunteers also mentioned communications from external organisations, namely mailing lists and press releases The University of Keele and The University of Wolverhampton, reinforcing the idea that partnerships with external organisations may be helping recruit new volunteers (see question 3). In addition, volunteers said they had heard about projects through volunteering at the William Salt library (then moving to volunteer at the record office), the website, personally from a project coordinator, the local newspaper, a notice board, through their own initiative (emailing or visiting to enquire about opportunities) and directly speaking to record office staff (e.g. at an open day). The persuasiveness of record office staff and sense of humour of many of the volunteers is attested to by one quip that they volunteered due to "arm twisting by Mrs Jackson."

7: (a) Why did you decide to volunteer for the Staffordshire Record Office, and what did you hope to gain from the experience?

Most volunteers appear to be interested in the skills and knowledge gained through volunteering, with interest in the subject, developing skills, and learning about Staffordshire and its history being the most popular reasons for volunteering. Volunteers therefore seem to be mostly motivated by intellectual curiosity and a desire to learn, which is not surprising for an archive. In addition, two volunteers indicated that "enjoyment" was a reason for volunteering, while a further mentioned their own research project, saying "I have started researching the Staffordshire parish I was born in, but didn't know the best way to continue. I am now learning how to continue."

"I have started researching the Staffordshire parish I was born in, but didn't know the best way to continue. I am now learning how to continue."

It is not just the intellectual challenge that volunteers seek, and the social aspect of volunteering should not be overlooked. While volunteer projects vary in size and some projects involve only one or two individuals, cheerful and lively conversation is not uncommon as volunteers work. Half of the surveys completed indicated that socialisation is a reason that they volunteer, and one response added "To be a part of a group with similar interests."

7: (a) Why did you decide to volunteer for the Staffordshire Record Office, and what did you hope to gain from the experience?

Reason for volunteering	Number	
To learn new skills or develop existing ones	21	66%
To learn more about Staffordshire and its history	21	66%
The subject of the project(s) interested you	20	63%
Meet or socialise with people with similar interests to yourself	16	50%
To be part of a project that improved the Staffordshire Record Office's service (e.g. through catalogue improvement)	13	41%
To be part of a project that had other benefits for the wider community (e.g. artistic or cultural outputs.)	10	31%
To gain work experience or employable skills	1	3%

A significant proportion of volunteers also indicated that they wanted to be part of a project that helped the Staffordshire Record Office or benefited the wider community (41% and 31% respectively), indicating a widespread desire to "give something back" as a motivation for volunteering.

(b) What benefits have you experienced from volunteering?

All options provided received very high "agree" responses, with both "I improved my knowledge in an area of interest" and "I enjoyed myself" each being selected by thirty-one of thirty-two respondents. "Not applicable" may have been selected if the style of a project rendered that option irrelevant. For example, one response that answered "not applicable" to "I have a greater understanding of Staffordshire, its history, and its people" was a member of the *Flooding and Drought* project who noted that the diaries they examined did not relate to Staffordshire.

The only responses that marked "disagree" to any options ("I developed new skills or improved existing ones") were volunteers for the *Place-Names* project. One indicated that they had volunteered for two months, so this may be attributed to only having been a part of the project for a short time, although the other said they had been volunteering for four years. In contrast, one response added specifically that they had developed their palaeography skills (the same individual who said they were seeking to learn to continue their own research).

(b) What benefits have you experienced from volunteering?

Benefit of Volunteering	Agree	Disagree	N/A
I improved my knowledge in an area of interest	31	0	0
I developed new skills or improved existing ones	26	2	1
I have a greater understanding of Staffordshire, its history, and its people	28	0	2
I enjoyed myself	31	0	0
I am inspired to find out more	28	0	1
I have met or socialised with people with interests similar to my own	27	0	2

8: Do you feel that your role as a volunteer is valued by the Staffordshire Record Office?

Every single response said that they feel valued by the Staffordshire Record Office. This would be expected of established volunteers, who perhaps would not continue if they did not enjoy it or did not feel valued. However every single one of the responses from recently recruited volunteers (including three who stated the time that had volunteered for as two months) also said they felt valued.

Record office staff are clearly a major reason why volunteers feel valued, and they described staff as "friendly" (five responses), "supportive" (three) and "welcoming" (two). Matthew Blake in particular is described as "always ready to help," and "friendly and attentive." Jessica Treacher, a PhD student on the *Place-Names* project was described as "supportive, well-organised and invariably positive." Several responses mentioned staff gratitude for their efforts and said that staff "express their thanks" and "always seem genuinely pleased at the work that the volunteers do." Only one response mentioned more official efforts to thank volunteers, mentioning that record office staff "acknowledge this publicly in newsletters [and] on websites [and] at annual celebration for volunteers." This suggests that although official acknowledgement by the record office is certainly appreciated, it is the regular interaction with record office staff that is most important to volunteers, including encouragement, gratitude and assistance.

"volunteers contribute to the archive service enormously and that this is regularly appreciated by staff"

Several volunteers said that the reason they feel valued is the impact that their work has on the service the Staffordshire Record Office provides. One noted that "Data is being recorded and documents catalogued that would not otherwise be done with the reduced staffing levels at SRO," another that "volunteers contribute to the archive service enormously and that this is regularly appreciated by staff," and another that "information is helpful to Record Office customers."

More frequently than any other comment is gratitude from volunteers for help and assistance provided by record office staff. Although one response says that "direction has been patchy," far more comments suggest that most volunteers feel they receive plenty of assistance. "Helpful" is mentioned by seven responses and "help" from staff by three. Some are very specific about the help they get, mentioning answering questions, giving advice and assistance "when responding to requests for records." Two volunteers express gratitude for sessions run to develop their skills and knowledge, one mentioning information sessions and another palaeography workshops that were run by Susan Kilby from the University of Leicester. Given that the common responses to question 7 (a) displayed a desire to develop skills and knowledge, it is not surprising that volunteers appreciate sessions and workshops that facilitate this.

9: Has volunteering with the Staffordshire Record Office changed your perceptions or knowledge of Staffordshire's history, people, culture or landscape? If so, how?

This and question 11 were designed as open-ended questions to encourage the volunteers to provide relatively unprompted remarks about their opinions and the impact of volunteering. In this case, the survey sought to understand some of how volunteering affects the volunteers' knowledge and perception of Staffordshire. One response replied simply "Yes – in many ways – I could write a thesis on this." Two responses indicated that volunteering had also increased their awareness of the breadth and types of records held by the archive service.

Several responses made specific reference to the subject of the project/s they were part of, with several mentioning WWI (which multiple projects have examined in different ways). Others have mentioned learning more about estate management, water management, agricultural practices, church finances, and female criminals in the 1870s. As established by question 7, volunteers are very motivated by the skills and knowledge acquired while volunteering, wanting to learn more about Staffordshire or the subject of their projects. It is not surprising then to find so many specific references to the subjects of particular projects.

Many responses indicated that they enjoyed or benefited from learning about their local area, mentioning Staffordshire's history, culture and geography. Some talked about specific parts of Staffordshire, one volunteer from the *Victoria County History* project, saying they "have certainly gained more knowledge of Staffordshire, particularly regarding Uttoxeter and its surrounding areas," and another volunteer mentioned east Staffordshire. While volunteering, as one volunteer says, "is enriching my knowledge of my local area," it also can inspire volunteers to continue learning, with one saying volunteering has "Given me a taste for finding another local project."

> "I feel that I have a greater knowledge of everyday life for ordinary people, an area of history that does not get much publicity focussed as we appear to be on kings and earls."

It is not just learning about the geography and history of Staffordshire that seems to appeal to volunteers. Many indicate a strong interest in social history, saying that volunteering has "personalised the broad outline of national history." Elaborating further, another volunteer

says, "I feel that I have a greater knowledge of everyday life for ordinary people, an area of history that does not get much publicity focussed as we appear to be on kings and earls," while others mention life in Staffordshire's villages, particularly mining villages. It seems that for many volunteers it is not just the subject of projects that is interesting, but the way that volunteering personalises history for them – learning more about their local area, and more about ordinary people.

10: Based on your experience with the project(s) you are part of, how likely are you to take part in a future volunteer project with the Staffordshire Record Office?

Twenty-nine (91%) of responses said they were either likely or definitely would volunteer for the Staffordshire Record Office again. Two replied with maybe, one of whom had volunteered on projects prior to their current one. The only response indicating that they were unlikely to take part in a future volunteer project was from a volunteer who was involved in *Criminal Quilts*. The respondent's other answers indicated that they were very happy with the project. However, *Criminal Quilts* project was a very different style to other projects, focused on producing artwork inspired by archival material rather than carrying out more traditional archive tasks or research. It may be that this style of project rather than the more traditional ones suit this person's interests more.

10: How likely are you to take part in a future volunteer project?

Response	Count	
Definitely will	19	59%
Likely	10	31%
Maybe	2	6%
Unlikely	1	3%
Definitely will not	0	0%

11: Do you have any further comments about volunteering with the Staffordshire Record Office?

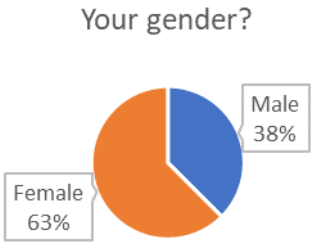
Every single comment in response to this question indicated a desire to continue volunteering in future. They included saying, "I love it!" "I would recommend it!" and "I will continue volunteering as long as I am able." However several respondents do express some concern about the future of the record office and volunteering, and the volunteers appear to be very conscious of changes with the archive service as well as staffing and funding constraints. One volunteer from the Lichfield Record Office says that, "I hope that it will be possible to continue with some

"I will continue volunteering as long as I am able."

volunteer work at the re-located library in Lichfield, once the main records are transferred to Stafford." Another mentions the proposed history centre, saying, "I am concerned that if the proposed extension to SRO will impact the ability of SRO to continue with volunteer projects." The survey was conducted in the months before the Round 2 application for Heritage Lottery Funding was rejected, and this response by a volunteer possibly reflects a great deal of uncertainty about the future. Another volunteer sees projects run by visiting researchers and project coordinators as providing a valuable way of facilitating volunteer projects, saying, "This project [*Flooding and Drought*] is important for the SRO as the way it is run is a new development for them. This style of working will be more important in the future as the SRO is encouraged by the HLF to have more community engagement with fewer staff. There will not be sufficient in-house resources to organise and support many such projects."

Section C: About you

12: Your Gender



Nearly two thirds of the Staffordshire Record Office's volunteers are female, with this survey producing almostexactly the same proportion of male and female volunteers as Williams' study in 2014,[1] and very similar numbers to Ray's in 2009.[2] However archive users nationally are more evenly split, with the 2016 Survey of Visitors to UK Archives indicating that users were 51% male, 49% female,[3] though the record office's own user profile from the same survey was 40% male and 60% female, closer to the gender profile of the volunteers.

12: Your gender?

Gender	Count	
Male	12	38%
Female	20	63%

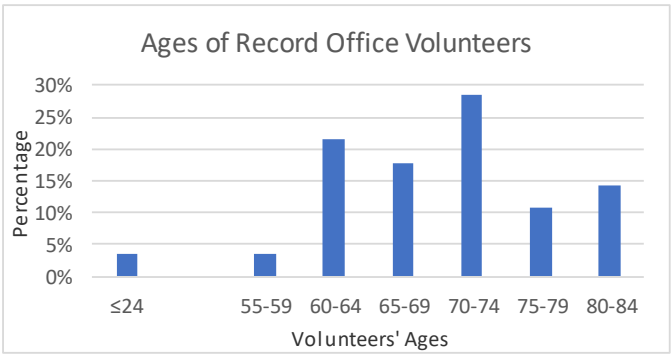
[1] Williams, "Managing Volunteering in Archives: Report," 13.
[2] Ray, "Volunteering in Archives: A Report for the National Council on Archives," 4.
[3] Cipfa, "Survey of Visitors to UK Archives 2016," 20.

13: Your Age

While every response stated their gender, four people opted not to give their age and percentages for ages are given as a percentage of those who did respond. Most archive volunteers are above or near retirement age, with more than 90% of volunteers over 60, and only one survey response reported being below 55. Both the modal and median ages for volunteers are 71. This explains why volunteers are motivated by their own interest and curiosity rather than developing employable skills or "CV building" (see question 7).

13: Your age?

Age	Count	
≤24	1	4%
55-59	1	4%
60-64	6	21%
65-69	5	18%
70-74	8	29%
75-79	3	11%
80-84	4	14%



Archives generally attract more users of retirement age, however there are still a considerable number of working age adults[4] (likely students and professionals using archives for work). The reason for the difference between user and volunteer ages is most likely because most adults of working age would not be able to afford as much time for voluntary work – whether due to careers, children or other commitments.

14: Your Ethnicity

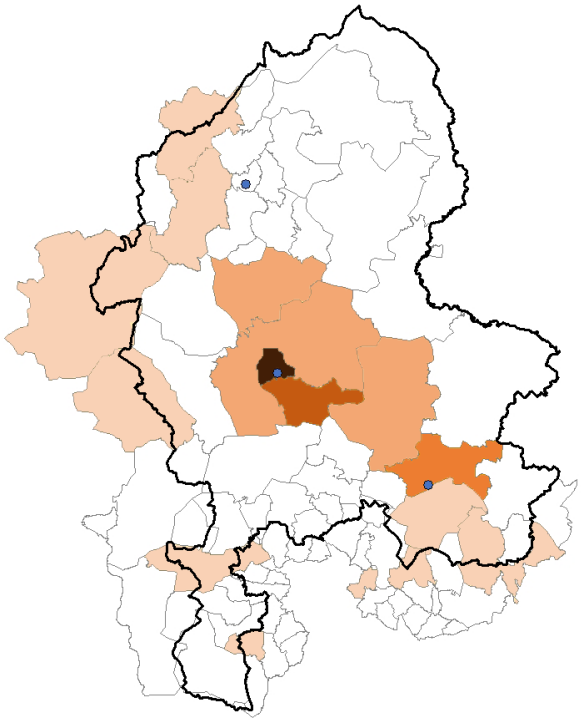
Four responses opted not to state their ethnicity, and all who did identified themselves as white.

15: What is the area code/first four digits of your postcode?

The volunteers were asked for the first four digits of their postcode (not their whole postcode). This gives a sense of where volunteers live and how far they might travel to the record office without asking for information that could identify them. Not surprisingly, most

[4] Cipfa, 20.

volunteers live within easy distance of the record office with six saying they live within ST16 (Stafford), although there are several from around Birmingham. No volunteers indicated they were from the north-east of the county, even areas close to the Staffordshire Record Office.



Postal district boundaries: Edinburgh DataShare, GB Postcode Area, Sector, District, Available at: https://datashare.is.ed.ac.uk/handle/10283/2597 (Accessed: 13th November 2018).
Customary county boundary: Boundary-Line™ [SHAPE geospatial data], Scale 1:10000, Tiles: GB, Updated: 18 September 2018, Ordnance Survey (GB), Using: EDINA Digimap Ordnance Survey Service, <https://digimap.edina.ac.uk>, Downloaded: 2018-11-07 16:10:35.272

16: Please indicate if you have a disability or condition that affects any of the following areas

5 (16%) of respondents said that they had one or more disability or condition (usually related to hearing), while 26 (84%) of individuals said they did not. This is slightly lower that reported for archive users by the 2016 Survey of Visitors to UK Archives.[5]

[5] Cipfa, 25.

16: Please indicate if you have a disability or condition that affects any of the following areas

Disability or condition	Count	
None / not applicable	26	(81%)
Hearing, e.g. deafness or partial hearing	4	(13%)
Dexterity, e.g. using a keyboard	1	(3%)
Mobility, e.g. walking short distances or climbing stairs	1	(3%)
Learning / understanding / concentrating	0	
Mental health	0	
Vision / eyesight, e.g. blindness or partial sight	0	
Any other, please state:	0	
Prefer not to say	0	

Bibliography

Unpublished source material

Held at the Staffordshire Record Office (SRO)

Including records which have contributed data but have not been cited in the body of the thesis.

Reference	Date	Title
100/1	16th-19th c.	Scrapbook
5350	1736 - 1738	Journal of Dr. Richard Wilkes, physician, of Willenhall, 1690-1760
D(W)1788/P49/B7	1593-1634	Papers concerning disputes over watercourses
D1287/Add III/3	1703-1704	Account of revenues and disbursements from the revenues of Wigan Rectory
D3243/4/1	1683-c.1775	Parish officers' account book
D3710/1/1	1570-1704	Register of baptisms, marriages and burials
D593/H/13/70-79	c.1851-1900	Trentham Lake and River Trent: alterations to banks and course at Trentham
D593/J/7/3/1	1623-1647	Pains laid at "Great Leets and Court Baron"
D593/J/7/4/3/1	1714-1746	Estreats
D593/P/9/8	22 Nov 1639	Memorandum of a temporary agreement between Walter Brooke of Lapley, esquire, and Richard Fenihouse, a copyhold tenant
D603/F/3/1/19	1703-1709	Burton Mills: joint annual accounts for clay, corn and malt mills
D603/H/1/2	nd [c 1780]	Map of lands in lease to George Anson of Shugborough in Shugborough adjacent to Haywood Park
D603/H/3/444	1809	Map of Marquis of Stafford's Trentham estate
D783/1/1/1	1547-1747	"Annales Aldervasenses" - Register of baptisms, marriages and burials

Q/SR/1- Q/SR/610/27	1581-1750	Quarter Sessions rolls

Leases

Reference	Year	Title
5249/2/40	1771	Lease of Fazeley Mill
7191/1/8a-b	1787	Two copies of a lease of a water stream with liberty of pounding of water
B/A/21/123384-89	1750	Lease of Benthams House or Mill House in Eccleshall
B/A/21/123417	1674	Counterpart lease of Bishop's Offley Mill
B/A/21/123417 (b)	1695	Lease of Bishop's Offley Mill
B/A/21/123417 (c.)	1713	Counterpart lease of Bishop's Offley Mill
B/A/21/123418	1752	Lease of Bishop's Offley Mill
B/A/21/123419	1758	Lease of Bishop's Offley Mill
B/A/21/123420	1767	Lease of Bishop's Offley Mill and surrender of lease
B/A/21/123421	1774	Lease of Bishop's Offley Mill
B/A/21/123422	1775	Lease of Bishop's Offley Mill
D(W)1734/J/1614	1595	Letters Patent granting a lease of the water corn mill of Shutborough parcel of the manors of Heywood and Shutborough, lately held by Thomas Lord Paget attainted for High Treason.
D(W)1738/C/5/6	1744	Lease of Mill called Pones Mill als Pound Mill
D(W)1738/C/6/3	1630	Lease of two corn water mills called Swynfen Mills with appurts and lands in Swinfen p Weeford
D(W)1738/C/6/6	1648	Lease of pool called Swinfen Pool
D(W)1781/9/2/59	1696	Lease of water corn mill called Wolseley Mills and appurtenances in Wolseley p. Colwich
D/3272/1/20/2/10	1766	Leases of messuages and water corn mills called New Inn Mills, Trentham
D/3272/1/20/2/9	1796	Leases of messuages and water corn mills called New Inn Mills, Trentham
D1287/6/2 (6/3/12)	1610	Lease of Mill and Mill House Martin Street Stafford
D1734/1/4/105a and b	1594	Draft leases of fulling mills at Burton on Trent

D1734/1/4/92	1582	Copy lease for twenty-one years of two water corn mills in Bromley Hurst and Bromley Pagets
D1798/647/2	1734	Lease: fulling or walk mill at Offley Hay p Eccelshall, and a corn or grist mill at Offley Hay - commonly known as Walk Mill
D1798/HM Aston/30/2	1587	Lease of a grain water mill at Shugborough, fishing in Shugborough Pool, 3 closes at Burton, waste land at Hednesford, pasture in Cannock Wood
D1798/HM Aston/30/3	1596	Lease of fishery in Shugborough Mill pool, late possessed by Thomas Lord Paget, attainted
D1798/HM/Aston/47/3	1500	Lease for 20 years of Sandon water mill
D1810/f.57d	1510	Lease of land at Tittensore Mill
D1851/8/53 (3)	1775	Darnford Mill and all the tools, implements and fixtures
D240/A/2/2	1566	Copy lease of mills at Alton (Alveton)
D260/M/E/425/1a	1741	Misc. leases of mills watercourses mines etc. 1a is a lease of a watercourse
D260/M/E4251b		Misc. leases of mills watercourses mines etc. 1b is part of the lease of a mill
D260/M/T/4/20/1	1709	Deeds to Cannock Mills with lands in Wyrley and Cannock, p. Cannock, and Hatherton, p. Wolverhampton
D260/M/T/4/20/14	1648	Lease of Cannock Mills
D260/M/T/4/20/15 (Copy of /14)	1648	Lease of Cannock Mills
D260/M/T/4/20/2	1697	Deeds to Cannock Mills with lands in Wyrley and Cannock, p. Cannock, and Hatherton, p. Wolverhampton
D260/M/T/4/20/5	1658	Feoffment of Cannock Mills
D260/M/T/4/20/6	1658	Lease of Cannock Mills
D260/M/T/4/21/1	1738	Lease of Cannock Mills
D260/M/T/4/24	1758	Assignment of a lease of a capital messuage and lands in Abbots Bromley
D3080/1-5	1773	Photostat copies of leases on Tutbuty Mills Rocester
D3080/1-5 a	1773	Photostat copies of leases on Tutbuty Mills Rocester

D3080/1-5 b	1786	Photostat copies of leases on Tutbuty Mills Rocester
D3272/1/20/2/6	1697	Leases of messuages and water corn mills called New Inn Mills, Trentham
D3272/1/20/2/7	1748	Leases of messuages and water corn mills called New Inn Mills, Trentham
D3302/8	1694	Counterpart lease for thirteen years of a messuage adjoining the Mill Green and lands in Bromley Hurst Abbots Bromley and Pagets Bromley
D3359/19/109	1798	Lease of Brund Mill Sheen
D4092/C/1/40	1586	Bundle of Perton leases
D4092/C/2/22	1759	Lease of water corn mill and drying kiln in Hill Chorlton
D4092/C/2/23	1780	Lease of water corn mill, mill house and building and parcels of land in Chorlton
D564/3/4/9	1717	Lease for 3 water corn mills with a dwelling house, called Balford or Palford Mills, and 4 small closes adjoining, Pattingham
D593/A/1/24/16	1512	Lease for life of lessee of Bowe Mill by Tamworth, with the flood gate and fishery
D593/B/1/10/22	1766	Lease for ninety-nine years, or three lives, of flint mill and lands. (Note this is the counterpart lease, the lease was lost at Loughton when Mr Griffin's house was robbed, Bill died April 16 1776)
D593/B/1/11/18	1797	Leases on various properties in Blurton, Lane End, Lightwood Forest, Meir Heath, ps. Stoke upon Trent and Trentham, including lease of Blurton Mill.
D593/B/1/23/41 (a)	1766	Counterpart leases of various properties in p. Trentham
D593/B/1/23/41 (b)	1778	Counterpart leases of various properties in p. Trentham
D593/B/1/26/6/29/9	1516	Lease for 15 years of one barn with a mill within it, two gardens in Bery (Berry) Street in Wolverhampton
D603/E/1/104	1623	Lease of three water corn mills called Burton Mills, two under one roof, one under a roof by itself, and also a horse mill in the Market Place
D603/E/1/123	1638	Lease of close called Moore Mill Dam
D603/E/1/172	1721	Copy of Counterpart Lease of fulling mill called Nether Walk Mill now converted into a forge for hammering and plating iron, with the lock lately erected in the mill yard

D603/E/1/181	1726	Lease of meadow in Lower Meadow, arable in Moore Mill Dam
D603/E/1/184	1726	Lease of Fish Gates, fulling mills and lands
D603/E/1/194	1731	Lease of the foreshare of a parcel of meadow Moore Mill Dam
D603/E/1/210	1739	Lease of parcel of meadow on Horninglow Street near Moore Mill Dam, pasture on Cat Street
D603/E/1/231	1745	Lease of watercorn mills called Burton Corn Mills, one other mill called Malt Mill, piece of meadow called Mill Piece or Lords Piece
D603/E/1/24	1562	Lease of Walkmills and house standing on the Trent near the corn mills with the brook called Workmill Brook and a meadow pleck belonging
D603/E/1/272	1762	Lease of messuage or tenement near the Butter Market
D603/E/1/290	1763	Lease of Burton Corn Mills
D603/E/1/294	1763	Lease of messuage in Market Street with malt mill and croft
D603/E/1/30	1574	Lease of walk mill or fulling mill newly erected and built on the River Trent
D603/E/1/311	1765	Lease of two bays of building where a mill lately stood for grinding malt, on south side Cornmarket
D603/E/1/315	1766	Lease of Upper Walk Mill with weir (Upper Weir) across the Trent and parcel of ground, two acres and one rood, at Bond End
D603/E/1/322	1766	Lease of fulling mill called Nether Fulling Mill
D603/E/1/326	1768	Lease of foreshare of meadow called Moor Mill Dam, seven acres, no roods, twelve perches
D603/E/1/481	1795	Lease of four tenements in Burton Extra and malthouse
D603/E/1/7	1560	Lease of fulling mill and fish work lately built in Burton
D603/E/1/72	1610	Lease of fulling or walk mills called Over and Nether Mills
D603/E/1/73	1610	Lease of flatt called Moor Mill Dam Flatt, thirty-one and three-quarter acres
D603/E/1/758	1764	Lease of a mill called Clay Mill, used as a forge for plating iron, with piece of ground one rood and Hill Close one acre thirty perches.

D603/E/1/804	1770	Lease re cottage in Winshill with brewhouse near Burton Corn Mills
D603/E/1/807	1789	Lease re messuage and brewhouse near Burton Corn Mills
D603/E/1/824	1635	Lease of Bromley Forge
D603/E/1/826-827	1732	Lease of forge or iron mill called Bromley Forge and mill to rod iron called Slitting Mill in Cannock Wood and site of Cannock Wood Furnace (demolished), with licence to build a new furnace if they wish
D603/E/1/829	1643	Lease of two water corn mills in Bromley Hurst, one a wheat mill furnished with French stones
D603/E/1/857	1729	Lease of messuage, water corn mill, windmill, Broomy Close and other closes
D603/E/1/858a-859	1774	Lease of messuage, water corn mill, Broomy Close and other closes
D603/E/2/116	1630	Assignment of a lease of a watermill in Longdon
D603/E/2/15	1730	Lease of messuage, watercorn mill and small croft
D603/E/3/1	1557	Lease of fulling mill with stream and watercourse and a parcel of waste ground lately enclosed in Rugeley
D603/E/3/114	1707	Lease of cottage or tenement on Cannock Wood near the slitting mills, half acre
D603/E/3/119	1708	Lease of cottage and hempplott near the slitting mills, half acre
D603/E/3/120	1708	Lease of cottage and garden in the sheep market against the mill, p. Rugeley
D603/E/3/130-131	1709	Lease of small cottage one rood, near the slitting mills
D603/E/3/168-169	1721	Lease of cottage in Rugeley near the slitting mill and parcel of ground one and half acre
D603/E/3/199	1738	Lease of cottage near the slitting mills in Rugeley and two parcels of land three acres
D603/E/3/213	1745	Elizabeth Birch; pools on Cannock Heath called Furnace Pool and Brindley Pool p Cannock and Rugeley
D603/E/3/216	1745	Lease of Slitting Mill, messuage, various lands etc, p. Rugeley
D603/E/3/217	1747	Lease of tenement in Cannock near New Hay, three crofts, five acres

D603/E/3/220-221	1747	Lease of tenement and garden near the slittling mill, croft, adjacent one acre
D603/E/3/227-228	1747	Lease of cottage near Beaudesert Park and two crofts, four acres
D603/E/3/233-234	1747	Lease of tenement and croft at Cannock Wood near the New Hay
D603/E/3/237	1747	Lease of tenement against the mill in the sheep Market, Rugeley, divided into two dwellings
D603/E/3/252	1748	Lease of tenement near the slitting mill, Rugeley
D603/E/3/274-275	1749	Lease of tenement and croft two acres near the slitting mill, Rugeley
D603/E/3/284	1753	Lease of tenement in Cannock, three crofts, five acres
D603/E/3/298-299	1775	Lease of messuage or tenement at Cannock Wood, p. Rugeley, close nearby, the Slitting Mill and forge and all pools, dams
D603/E/3/302	1783	Assignment of lease of tenement and croft two acres near the Slitting Mill, Rugeley
D603/E/3/303	1788	Assignment of lease of tenement and croft two acres near the Slitting Mill, Rugeley
D603/E/3/304	1791	Assignment of lease of tenement and croft two acres near the Slitting Mill, Rugeley
D603/E/3/306	1799	Assignment of lease of tenement and croft two acres near the Slitting Mill, Rugeley
D603/E/3/307-308	1800	Licence to assign and assignment of lease of tenement and garden near the slitting mill, Rugeley
D603/E/3/310-311	1806	Lease of all that mill used for cutting iron called slitting mill on Cannock Wood, p. Rugeley and all the forge thereto belonging with all fords, dams etc
D603/E/3/317	1817	Lease of cottage near the late slitting mill, Rugeley
D603/E/3/318	1817	Lease of cottage and garden one quarter acre near the late slitting mill
D603/E/3/52	1647	Lease of slitting mill in Rugeley and various lands and rights
D603/E/4/1	1562	Lease of all that mill called Shugborough Mill with the watercourse, and all grists, suits and customs
D603/E/4/19	1657	Lease of corn mills in Shugborough called Shugborough

		Mills
D603/E/4/2	1608	Lease of messuage and lands in Shugborough
D603/E/4/25	1681	Lease of grist water mill and mills called Shugborough Mills
D603/E/4/26	1691	Lease of parcel of meadow of pasture two and half acre near Shugborough Mill
D603/E/4/39	1703	Lease of fulling mill erected where the mills known as Shugborough Mills formerly stood: consisting of one stock and one shaft together with three bays of building
D603/E/4/4	1611	Lease of messuage and lands in Shugborough
D603/E/4/58	1718	Lease of a capital messuage called Haywood Park and closes belonging and all those paper mills within the said Park
D603/E/4/6	1611	Lease of fulling mill and two cottages or tenements in Shugborough
D603/E/4/62	1729	Lease of parcel of flaggy ground called the Soggs, three acres, near Shugborough Mills
D603/E/4/8	1622	Lease of water corn mill in Shugborough
D603/E/4/81	1774	Lease of messuage and barn at the Woodside p. Colwich and many closes at Shugborough (recited in full) including site of former fulling mill
D603/E/5/1	1582	Lease of water mill called Hasyll Mylle and one pole of water ground on which it stands and one acre of land and watercourses in Pillaton Hall, Penkridge and Teddesley Hay
D615/D/10/1	1771	Lease, and later conveyance, of The Pingle, Colliers Meadow, Barn Croft, The Seggs (now made into a pool), site of the old Shugborough mills used as a fulling mill, Tenters Flatt, etc.
D615/D/10/3	1729	Lease of the Seggs
D615/D/10/4	1748	Assignment of the Lease of the Seggs
D615/D/18/1	1659	Lease of the fulling mill in Shugborough (Shutburrowe)
D615/D/18/4	1740	Lease of the paper lately fulling mill in Shugborough
D615/D/19	1693	Lease of the west end of the paper mill to be made into a walkmill

D615/D/20/1	1719	Lease of a fulling mill of 3 bays with a stock and shaft near where Shugborough (Shutburrough) Mills formerly stood
D615/D/20/2	1730	Assignment of a lease of a fulling mill of 3 bays with a stock and shaft near where Shugborough (Shutburrough) Mills formerly stood
D615/D/20/3	1730	Assignments of a lease of a fulling mill of 3 bays with a stock and shaft near where Shugborough (Shutburrough) Mills formerly stood
D615/D/20/4	1731	Assignment a lease of a fulling mill of 3 bays with a stock and shaft near where Shugborough (Shutburrough) Mills formerly stood
D615/E/2/1	1755	Lease of Alrewas Mills with grist etc. And eels taken at the flood gates Alrewas
D615/E/6/1	1744	Lease of Malt House and fulling mill (lately burnt down)
D615/E6/6	1759	Lease of Lower Mills, Mill House etc.
D641/4/A/2/6/4	1644	Lease of Messuage and Mill
D740/8/13	1648	Surrender of lease of Heackley Mill and land Orton
D742/A/21	1741	Lease of water and watercourse of River Tame with corn mill called Joane Mill, West Bromwich forge, pools and appurts p. West Bromwich
D77/9/11	1694	Counterpart lease for 32 years of a shop under west end of steeple of St Mary's Church in Weoman's Cheaping Lichfield
D77/9/22	1710	Counterpart lease for seven years of new mill or fulling mill on waste ground near Stowe Mills Lichfield
D77/9/59	1664	Counterpart lease for seven years of the manor of Lichfield with Mault Mill and Stowe Mill and office of beadle of the manor
D77/9/60	1696	Counterpart lease for 21 years of 2 water corn mils called the Malt Mills in Dam Street and 3 water corn mills called Stowe Mills in Stowe Street
D77/9/61	1718	Lease for forty years and surrender of water mills in Dam Street Lichfield formerly corn mills (called the Malt Mills) now converted by George Lowe into oil mills with all running gear, utensils tools etc.

D77/9/63 (1)	1717	Counterpart leases for 21 & 14 years and related documents of three water corn mills called Stowe Mills with appurtenances goods and chattels in annexed schedule (missing) Stowe Street Lichfield
D77/9/63 (2)	1753	Counterpart leases for 21 & 14 years and related documents of three water corn mills called Stowe Mills with appurtenances goods and chattels in annexed schedule (missing) Stowe Street Lichfield
D786/25/5	1669	Lease of fulling mill or walk mill adjoining the corn mill Rocester
D952/2/2/2/1	1795	Leases of an ancient water mill usually called the Old Paper Mill situated on the Colebrook, Tyrley with plan and elevation of mill
D952/2/2/2/3	1810	lease of paper mill in Tyrley
LD77/9/63 (2)	1753	Counterpart lease

Title deeds

Reference	Year	Title
B/A/21/123417 (a)	1695	Surrender of Lease of Bishop's Offley Mill
D(W)1788/BoxA7/A	1630	Deeds to Shraley House, water corn mill etc. in Knoll End p Audley
D/3272/1/20/2/8	1766	Leases of messuages and water corn mills called New Inn Mills, Trentham
D/615/D/21/2	1797	Shugborough paper mill and other parcels of land at Shugborough; Agreement to sell. Also other documents relating to the descent of title of the properties
D/615/D/21/3	1799	Shugborough paper mill and other parcels of land at Shugborough. Release of a freehold estate and covenant to surrender a copyhold estate.
D1798/589/12&13	1777	Final Agreement and counterpart; property in Cannock, Leacroft, Wyrley and Hatherton.
D1798/589/3	1730	Marriage Settlement on marriage of Edward Wilson of Cannock and Katherine Okeover one of the daughters of Thomas Okeover ; properties in Cannock including water corn mills
D1798/589/6&7	1756	Final Agreement and counterpart; property in Cannock, Leacroft, Wyrley and Hatherton.
D1798/5891&/2	1700	Lease of water corn mill or mills with dwelling house and meadow adjoining, in Cannock.

D1851/8/53/ (5)	1781	20 messuages 1 shop 1 watermill and land in Lichfield; common recovery
D1851/8/53/ (6)	1783	Bond by Edward Johnson of Darnford Mill to his father Thomas Johnson outlining the conditions upon which he holds the mill, in the nature of a family settlement
D260/M/T/4/20/10	1650	Mortgage of Cannock Mills (quotes lease between William Lord Pagett, John Byrche and Robert Sankey dated 12 October 1650)
D260/M/T/4/20/11	1650	Bargain and sale of Cannock Mills
D260/M/T/4/20/12 (Copy of /10)	1650	Mortgage of Cannock Mills (quotes lease between William Lord Pagett, John Byrche and Robert Sankey dated 12 October 1650)
D260/M/T/4/20/13		Final Concorde
D260/M/T/4/20/16	1709	Reversion of right to Cannock Mills (quotes will of Edward Rowley deceased)
D260/M/T/4/20/3	1699	Feoffment of Cannock Mills
D260/M/T/4/20/4	1662	Quitclaim; Cannock Mills
D260/M/T/4/20/8	1699	Feoffment of Cannock Mills
D260/M/T/4/20/9	1658	Feoffment of Cannock Mills (quotes indenture between William Lord Pagett, John Byrche and Robert Sankey dated 12 October 1650)
D260/M/T/4/21/2	1754	Transfer of Mortage Cannock Mills
D260/M/T/4/22/1	1750	Lease for a year to property in Cannock and Hatherton
D260/M/T/4/22/4	1756	Lease for a year to property in Cannock and Hatherton
D260/M/T/4/22/5	1756	Assignment of mortgage and release
D260/M/T/4/22/6	1750	Mortgage of propery in Cannock and Hatherton
D260/M/T/4/23/1	1757	Mortgage of mill in Cannock. Recites previous leases.
D260/M/T/4/23/10	1747	Lease of lands in Cannock
D260/M/T/4/23/11	1749	Further charge on mortgage of an estate in Cannock
D260/M/T/4/23/12	1754	Lease of lands in Cannock (see D260/M/T/4/21/2)
D260/M/T/4/23/13	1749	Release of lands in Cannock
D260/M/T/4/23/14	1757	Release of lands in Cannock
D260/M/T/4/23/15	1754	Transfer of Mortage Cannock Mills

D260/M/T/4/23/9	1747	Release by way of mortgage of lands in Cannock
D3138/25	1671	lease for 1000 years of property in Shenstone including 2 water corn mills
D3272/5/25/4/2	1755	Lease/Assignment of cottage and two water corn mills called Knutton Mills (in the parish of Wolsatanton)
D3272/5/25/4/3	1755	Assignment and extension of trust for cottage and two water corn mills called Knutton Mills (in the parish of Wolstanton)
D4363/D/1/2-4	1741	Lease for possession and mortgage by release/ demise of a capital messuage called Madeley Court and lands etc. Including a corn mill in the parishes of Madeley and Badger Salop
D4452/1/14/1/86	1827	Lease and release of messuages mills and lands in Wolstanton and Audley in trust for the Rev Charles Stephen Hassells
D593/A/1/24/13	1545	Copy of decree of the Court of Chancery in an action concerning a lease of lands in Tamworth co. Staffordshire and Bolehall (including Bolehall Mill) p. Tamworth, co. Warwickshire
D593/B/1/11/1/1	1766	Deeds to fourteen closes in Lane End, acquired from Richardson and Wotton, in 1766
D593/B/1/22/7/6	1685	Lease of 3 water corn mills Darlaston
D593/B/1/26/11/25	1656	Lease for possession of lands in Wobaston and Saltmore
D593/B/2/5/6	1656	Deeds to Manor of Waters Upton, Shropshire
D593/C/22/2	1769	Documents concerning various marriage settlements of Granville Leveson Gower and the estates of Louisa his second wife, and John, First Earl Gower
D603/A/1/23	1650	Lease for ninety-nine years of a messuage in Abbots Bromley in the occupation of Abigail Stringer and Richard Wattson and a water corn mill called Bromley Mill and a water corn mill in Cannock in the occupation of Margaret Coleman
D615/D/10/2	1781	Lease, and later conveyance, of The Pingle, Colliers Meadow, Barn Croft, The Seggs (now made into a pool), site of the old Shugborough mills used as a fulling mill, Tenters Flatt, etc.
D615/D/18/2	1673	Conveyance of the paper lately fulling mill in Shugborough
D615/D/21/1	1784	Shugborough paper mill and other parcels of land at

		Shugborough. Marriage Settlement of William Kelsall and Elizabeth Spencer.
D661/6/2/5	1724	Draft assignment of lease, in trust of moiety of Manor of Freeford. Leases in Lichfield (street names). Darnford Mill house at Streethay, lands at Freeford and Lichfield (field names). Manor of Fulfen
D661/6/2/6	1723	Draft assignment of lease, of moiety of Manors of Freeford and Fulfen. Lands and house at Streethay, Darnford Mill, lands and houses in Lichfield.
D661/6/2/7	1729	Draft assignment of lease of moiety of Manor of Freeford. Houses in Lichfield (street names), Darnford Mill, house in Streethay. Lands at Freeford and Lichfield (field names), Manor of Fulfen.
D7336/1/7a-b	1702	Grant of the manor or reputed manor of Brocton, or Brocton under Cannock, with messuages, mills and lands, being a settlement on the marriage of Walter Chetwynd to Mary Sneyd
D786/25/6	1706	Release being the second part of lease and release of three water corn mills and a fulling mill or walk mill in Rocester
D802/1/1-2	1704	Lease and release of Manor of Hide, capital messuage called Hide, water corn mill and lands all in Brewood

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ASSI 2/1-15	1657-1750	Crown minute books

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